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I. GENERAL INFORMATION

MANAGEMENT OF SOCIALIST MODERNIZED AGRICULTURE DISCUSSED

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[Article by Hao Shengqi [6787 4141 3823], Li Genpan [2621 2704 5847] and Qin Qiming [4440 0366 2494]: "Develop China's Agriculture With the Idea of Managing Socialist Modernized Agriculture"]

[Text] In accelerating the speed of agricultural development in our country, an important question is to free ourselves from the shackles of thinking in terms of a small peasant economy and start to think in terms of modernized socialist agriculture. Many comrades agree with this. However, what is the traditional thinking of the small peasant economy (or traditional concept of small-scale production as it is sometimes called) and how do we handle the traditional small peasant economy in our country? What actually are the relations between modernized socialist agriculture, traditional agriculture and traditional agricultural technology built on the basis of the small peasant economy? What should the ideological basis be for managing socialist modernized agriculture? These questions have not been fully studied and discussed. This article attempts to give some shallow opinions on the question of the thinking of managing modernized socialist agriculture.

I

At present, one view deems that the one-sided small peasant economic structure is the root cause for the long period of disturbances and poverty in our country. We think that it is necessary to study this viewpoint. Here, the "economic structure" refers to the form of integration and the proportional relations between the various production departments in agriculture. It is different from the "economic structure" which is the "sum of all relations of production" discussed by Marx. We think that it is more appropriate to term it as "structure of production." It belongs to the domain of productive forces. The so-called "small peasant economy" refers to a kind of economy formed by the individual peasant households which occupy a certain piece of land and other means of production to carry out independent management. It basically belongs to the realm of the relations of production. Therefore, we should not mix up these two concepts of "small peasant economy" and "structure of production" which belong to different realms. Moreover, everyone knows

that in the former capitalist period, the small peasant economy was, generally speaking, the self-supporting natural economy by which a peasant household managed production of various kinds at the same time. Its structure of production was not "one-sided." If it was "one-sided," it could not become a self-supporting small peasant economy. It can be seen that the concept of "one-sided small peasant economy structure" is not scientific. This poses the question of how to understand the traditional small peasant economy in our country. We think that:

First, the View That the One-sided Small Peasant Economic Structure Has Been the Root Cause for Disturbances and Poverty in Our Country for a Long Time Has Reversed the True Relations in the History of Social Economy

The small peasant economy has never been an independent economic form. It was born at the time of the disintegration of the primitive commune and has existed to a varying extent in the various forms of production ever since. Marx said, "One part of the small peasant economy and independent handcraft production formed the foundation of the feudal mode of production. Another part coexisted with capitalist production after the disintegration of the feudal mode of production. At the same time, after the collapse of the primitive oriental system of public ownership and before the true domination of production by the system of slavery, they still formed the economic basis at the peak of the classical society." (Marx: "Das Kapital," People's Publishing House, 1975 Edition, Vol 1, p 372 Note 24) The small peasant economy has different characteristics in the different modes of production. These characteristics and their development were determined by the relationships of production which occupied a ruling position at that time. In a word, in these modes of production, the small peasant economy cannot play a dominant, decisive role in promoting or obstructing the development of the social productive forces. For example, in the classical system of slavery in Greece, individual small peasants were the mainstay in the structure of the common people. Following the development and continuous disintegration of the slavery system, some people had become debtor slaves. After the reform of Suolun, the system of debtor slaves was abolished and the ruling foundation of the slave-owners was expanded. Some common people (small peasants) took the path of using slaves to carry out production. Small peasants were all the more clearly branded with the slavery system. Under the ancient oriental slavery system, individual peasants had, on the surface, retained their identities as members of the villages and communes, but in fact, they were only "common slaves" in dictatorial countries just as Marx said. They still could not escape from being branded by the slavery system. The widespread existence of a small peasant economy is one of the characteristics of a feudal society. This is the same in China or in Western Europe. The form of existence of this small peasant economy is determined by the feudal system of land ownership. In Western Europe, there was the system of feudal lords. The serf acquired a piece of land but had to

work on the owner's land at the same time. In our country, there was the system of feudal landlords after the period of the warring states, Qin Dynasty and Han Dynasty. The peasants owned a small piece of land and gave farm tax and excise tax and rendered services to the feudal state of the landlord class, or rented a piece of land from the landlord and rendered land taxes in kind. The independent economy of serfs and peasants is to guarantee the provision of labor to be exploited by the landlord class. Just as Lenin pointed out, this peasant economy is the essential condition for the existence of a landlord economy. It can be seen that in the feudal mode of production, the small peasant economy is in a passive position.

It must also be pointed out that the long period of poverty and backwardness in our country was mainly found toward the end of the feudal society. Before the middle of the Ming Dynasty, our country had for a long time occupied a leading position in the world with its thriving economy, developed science and technology and splendid ideology and culture. In the history of our country, there was no lack of dynasties with a comparably lengthy, peaceful reign. In the Middle Ages in Western Europe, there was a long period of disunity, the alternation of their dynasties was no less frequent than those of our country. Therefore, it is very incorrect to make generalizations about the 2,000 year history of our country since the epoch of spring and autumn as one of "disturbances and poverty." It is worthwhile to thoroughly study the internal cause for the long period of poverty and backwardness in our country toward the end of the feudal society. However, we can in no way jump to the conclusion that the small peasant economy is the root cause for the long period of poverty and disturbances in our country.

As mentioned above, the small peasant economy has existed in various countries during different historical periods and is not peculiar to the period after the epoch of spring and autumn in our country. If a small peasant economy can constitute the root cause for disturbances and poverty, no country and no dynasty could escape the fate of disturbances and poverty. Seen from the particularities of feudal society, whenever the feudal government adopted more realistic and effective measures so that the small peasants could obtain relatively stable conditions of production, the society would become relatively stable with a thriving economy. On the contrary, if land annexation was allowed, thus sabotaging the peasants' conditions of production and causing poverty and bankruptcy among a large number of small peasants, the society would suffer from tumult and the economy would collapse.

Marx pointed out, "No social form will perish before it brings into full play all the productive forces which it can contain, while no new and higher relations of production will emerge before the material conditions for their existence are ripe in the womb of the old society." (Marx and Engels: Selected Works, "Introduction to the 'Critique of Political Economy'" Vol 2, p 83) The small peasant economy in the feudal society in our country can also be viewed in this way. We do not deny that in

the later period of the feudal society in our country, small-scale peasant economy had played a certain role in restricting the further development of the productive forces. However, it should also be admitted that the small peasant economy at that time basically conformed to the level of productive forces. It still had its vitality. What became the main shackles to social productive forces at that time and in particular to productive forces in the countryside were the feudal relations of production which occupied a dominant position. In modern times, there is also imperialism and bureaucratic capitalism. It was precisely because of the oppression of the "three big mountains" and the constant partial or total separation of the broad masses of peasants from the land--the main means of agricultural production--that their mood of production was tremendously suppressed and restricted. This oppression made the peasants unable to increase reproduction and often made it difficult even to maintain simple reproduction. They toiled throughout the year but were not adequately fed or clothed. When there was famine caused by drought or flood, or wild battles among warlords, they fled everywhere. The fields and land were deserted and desolate with starved bodies all over the place. The root cause for this serious sabotage of the agricultural productive forces and even the poverty, disturbances and backwardness of the entire society was the feudal economic and political system, imperialism, feudalism and bureaucratic capitalism and not the "one-sided peasant economic structure." These views demonstrate that it is in fact not accurate to attribute the "evil consequences" to the "one-sided small peasant economic structure." For example, the drastic periodic sabotage of the social productive forces caused by the evil development of land annexation in the history of our country is an inevitable phenomenon caused by characteristics peculiar to the feudal system of land ownership in our country and the small peasant economy should not be blamed. Just on the contrary, the poverty and bankruptcy of the small peasant economy and the sabotage of the conditions of forestry and animal husbandry were directly caused by the oppression of the landlord class and land annexation. It is unscientific to charge the various social problems born in feudal society in our country to the account of the "small peasant economy" (or "economic structure"). In fact, the democratic development led by our party was precisely directed against the "three big mountains," the root cause for poverty and backwardness in modern China. Once this root cause is eradicated, the social productive forces will shatter the trammels binding them. After victory in the war of liberation and land reform, the facts of rapid revival and development in agricultural production in our country have fully proved this point. It was only after this and following the further development of productive forces in the countryside that decentralized management and the small-scale economy of the individual peasant households gradually revealed their incompatibility with the development of productive forces and eventually became an obstacle to the development of productive forces. We should, in conformity with historical facts, attribute the cause of the long period of poverty and disturbances in our country in modern times to the feudal relations of production and oppression by the three

big mountains and not in the small peasant economy. Otherwise, in reality we negate the basic theory and practice with which our party has led the Chinese revolution for the past half century.

Second, Without Grasping the Characteristics of the Small Peasant Economy, It Is Not Possible To Discover the Key for Overcoming the Restrictions of the Thinking of the Small Peasant Economy

No matter whether in China or in Western Europe, the characteristics of the small peasant economy in feudal society is not any "one-sided economic structure," but is the so-called "small but comprehensive" natural economy. "Small" refers to the crudity of the means of production and the narrowness of the scale of management. "Comprehensive" refers to the management of simultaneous, multiple projects, with the cultivation of grain as well as economic crops, the breeding of domestic animals and fowls as well as some gathering of plants, hunting and fishery and even management of some household handicraft industries such as textiles. In this way, a peasant household formed a self-supporting economic unit in the countryside in feudal society. Now some comrades regard the sole cultivation of grain as the manifestation of the history of the thinking of the small peasant economy. This is really a wrong attribution.

Then, what is the main manifestation of the restrictiveness of the small peasant economy and its reflection in ideology? We think that it is embodied in the three following points: 1) The narrowness of the scale of production has restricted people's views and they lack a comprehensive view and long-term plans in the struggle for the utilization and transformation of nature. 2) Owing to the variety in production items and self-sufficiency in the basic needs of production and livelihood, they seldom establish exchange relations with other producers and foster the thought of "self-sufficiency with no dependence on other people." 3) Since we have adopted and used traditional production tools and production technology for the past thousand years and acted according to experiences, we tend to be conservative in our thinking and do not easily accept new things. In sum, these are the narrowness, isolationism and conservatism produced by the characteristics of a small peasant economy. It should be pointed out that since the establishment of cooperatives, agriculture in our country no longer consists of the small peasant economy but is a developing socialist agriculture. The main cause for the sabotage of the development of agricultural production in our country years ago was not the influence of the small peasant economy ideology but the ultraleft line and ultraleft thinking. But the habits and concepts of small production still exist among some comrades and are also reflected in the policies and guidance for the development of our agriculture. This thinking is basically different from the ultraleft line of Lin Biao and the "gang of four," but is used by the ultraleft line to a certain extent. Therefore, it is still an important task facing the building of modernized socialist agriculture today to shatter the narrowness, isolationism and conservatism of the small peasant economy.

Third, It Is One-sided and Unscientific to Totally Negate Traditional Agriculture and Traditional Agricultural Technology Built on the Foundation of the Small Peasant Economy

There are considerable problems in traditional agriculture and traditional agricultural technology in our country. But compared to agriculture and agricultural technology in Western Europe in the same period, they have reached a relatively advanced level under the prevailing conditions. This is universally acknowledged. We should not be presumptuous and conceited on this question and should not adopt the attitude of national nihilism. Here, we make some crude analyses of the historical characteristics, the shortcomings and strong points and the main trend and side issues of traditional agriculture and traditional agricultural technology in our country.

There are common points as well as different historical characteristics between the traditional agriculture in our country and the agriculture in the Middle Ages in Western Europe. The feudal system of leadership was dominant in Western Europe in the Middle Ages. The manors of the feudal lords were built on the wreckage of rural communes and land could not be bought or sold. Serfs who had acquired a small piece of land were personally dependent upon the feudal lords. Although they carried out independent management, such management lacked autonomy. At that time, the "three-garden system" of cultivation and fallow land was implemented. One part of the arable land was used for growing winter crops, another part of the arable land was used for growing spring crops and a third part of the arable land was allowed to lie fallow. They rotated and the order was determined by the traditional habits which had prevailed in the villages and communes for several centuries in the past. However, their conditions of production were also relatively stable. The land could be inherited and generally, there was no danger of losing it. At the same time, there were public livestock farms and pastures in the villages and communes for grazing flocks. Since the warring states, the feudal society in our country has implemented the system of feudal landlords and the remnants of the villages and communes had long since disappeared. Land could be bought or sold. One group of peasants were owner-peasants. They owned their small pieces of land. Another group of peasants were tenant farmers. They rented small pieces of land for cultivation from the landlords. They were more independent in their management when compared with serfs in Western Europe. There was on the whole less intervention from the feudal countries and landlords. However, their conditions of production were constantly threatened by land annexation from the landlord class. There were no fixed public livestock farms and there were no regular owners of fields." The conditions of production were extremely unstable.

It was precisely this historical characteristic of the traditional small peasant economy in our country which gave rise to the strong points and shortcomings of traditional agriculture in our country. Since there was private ownership of land, relative freedom of the person and

relatively independent management, peasants in the feudal society in our country had a much higher enthusiasm and initiative in production than serfs in Western Europe. They had no properties except their hands and could only get up early and work late. They put a lot of labor into the piece of land which they owned or rented and were meticulous in the cultivation of crops so as to get the maximum production possible on the limited land and support the livelihood of the whole family. The excellent tradition of intensive cultivation in agriculture in our country was born under precisely such historical conditions. Integration of the maximum use of land with active preservation of soil fertility is another merit in traditional agriculture in our country. The rate of land utilization in traditional farming in our country was very high. As early as in the spring and autumn epoch and the period of the warring states, the system of fallow land and cultivation was gradually transferred to the system of continuous cropping. Peasants throughout the ages have created the various forms of crop rotation, multiple-cropping and interplanting. Meanwhile, peasants throughout the ages have placed great emphasis on maintaining the fertility of the land. They understood long ago the use of green manure, human and animal excrement, and how to cultivate green manure and carry out the rotation of planting green manure and crops. In a considerable number of agricultural districts, the index of multiple cropping on the arable land was relatively high, but the fertility of the land was maintained after several thousand years of cultivation. This has been regarded as a miracle by foreigners. Chen Fu, agriculturist in the Song Dynasty criticized the argument that soil fertility was bound to drop after cultivation and pointed out that provided there was constant application of fertilizers, the soil would become even richer with cultivation and soil fertility could be constantly maintained. The view of the constant fertility of soil is the real essence of tradit nal thinking in agriculture in our country. In recent years, in the reform of the system of cultivation in some places, there have emerged the tendencies of one-sided pursuit of the index of multiple-cropping and negligence in the maintenance of soil fertility. Some comrades also attributed this to influence of the thinking of the traditional small peasant economy. This was really a slander of the ancient people. There is an outstanding merit in traditional agriculture in our country, that is: although the scope of management is very small, the integration of various forms of management within this fixed scope saves money and time and there are considerable rational points in the utilization of nature. For example, livestock farming and accumulation of fertilizers are very successful experiences of peasants in our country. In the use of agricultural and subsidiary products and the wide selection of wild plants for feeding pigs, cattle and goats and so forth and the accumulation and use of animal excrement to fertilizer fields, we have made full use of the relationship between animals and plants of depending on one another and promoting one another and organically integrated farming and livestock breeding within a fixed domain. In the Middle Ages in Western Europe, animal husbandry occupied a greater proportion because of the existence of livestock farms in villages and communes. However, public livestock farms were fixed and were not used as arable land, thus the excrement of animals was not properly saved for fertilizing fields and animal husbandry could not bring into full play its role of promoting agriculture.

In traditional farming in our country, there are many examples of the success of the rational use of nature and the clever use of mutual dependence between various animals and plants. We should seriously sum them up and bring them into full play.

Although there were many merits in traditional farming in our country and our labor productivity was much higher than that of West Europe in the Middle Ages, the scale of management was after all very limited, the conditions for production were very unstable and on the whole, it was only possible to maintain simple reproduction and the scale of production could not be expanded. They could make a certain rational use of nature within a certain scope, but on the whole, these dispersed and isolated individual peasants could not rationally make use of nature with in a greater scope and could not overcome the various natural disasters. Under the oppression of the landlord class in particular and under the pounding waves of land annexation, the small peasant economy was constantly in the plight of poverty and bankruptcy. In the history of our country, after a group of peasants had gone bankrupt and lost their land, they were forced to go up into the mountains to open up wasteland. They adopted a backward form of "cultivating land by first setting fire to it." They cultivated land by setting fire to it and immediately discarded the land after 2 to 3 years of cultivation. They then looked for land elsewhere and set fire to it so as to open up wasteland. This essential form of making a living sabotaged natural growth. However, the basic reason lay not with the small peasant economy but with the reactionary feudal relations of production. Seen from a broader historical context, this was not the main trend in traditional agriculture in our country.

II

What should be the basis for building the thinking of managing socialist modernized agriculture? In the building of modernized, socialist agriculture, it is not possible to adopt a totally affirmative or negative attitude toward traditional agriculture and modern capitalist agriculture in our country. There is a tendency now which deems that there is nothing worth inheriting in traditional agriculture in our country. But it completely affirms modern capitalist agriculture. This is a metaphysical concept. In fact, in traditional agriculture in our country which is built upon the basis of the small peasant economy, there are also many rational and scientific components as mentioned above. Modern capitalist agriculture is not all good. What we must study and learn from is the advanced scientific technology, material technical installations and rational management methods in modern capitalist agriculture. If we learn advanced things from them which are not compatible with the actual conditions in our country, negative results will be obtained. For example, a high degree of mechanization has been attained in farming in the United States with very high labor productivity. But the per unit yield is not very high. There is a tremendous consumption of material resources and fuel. The utilization of natural resources is not rational enough and there has not been a good solution to the problems of soil erosion and environmental pollution. Marx pointed out, "The lesson of history is (this lesson can be obtained by examining agriculture from

another angle), the capitalist system and rational agriculture contradict one another, or it can be said that rational agriculture and the capitalist system are incompatible with one another (although the capitalist system gives impetus to the development of agricultural technology), what rational agriculture needs is the hands of small peasants who earn their own living and the control of producers who unite together." (Marx: "Das Kapital," Vol 3, p 139) It can be seen that it is not correct to completely and uncritically affirm agriculture in capitalist countries. In sum, we think that we must start from the realities of natural, socioeconomic conditions and historical traditions in our country, absorb all the good things in the history of our country and other countries, discard all the things which do not conform to the actual needs of our country and build modernized socialist agriculture in accordance with the characteristics of our country. According to this principle, we think that from the angle of organizing productive forces, the thinking of managing modernized socialist agriculture in our country should include the following basic points:

First, There Must Be Overall Plans for Developing Agricultural Production Which Conform to the Objective Facts

Although a small peasant economy can make clever use of the relations between various natural plants of promoting one another within a fixed scope, it cannot make rational use of nature in a planned way on a larger scale. Owing to the private ownership of the means of production and anarchy in production, capitalist agriculture is completely unable to do this. Only the socialist system can provide us with the necessary prerequisite for consciously knowing nature and rationally utilizing and transforming nature in a planned way. Over the past 30 years, in charting the plans of agricultural production, we have not carried out a comprehensive and thorough investigation into the natural resources, natural conditions and socioeconomic conditions, neither have we made overall arrangements between the various agricultural departments and the various links in agricultural reproduction. Therefore, in guiding socialist agriculture, we are still blind to a fairly large extent. The forests and grassland in many places have been destroyed, the lakes have silted up, there has been serious soil erosion and disruption of the reasonable balance of ecology. This is, to a very large extent, an evil consequence of the blind guidance caused by the influences of the ultraleft line and ideology. However, an important reason was the blindness directing agricultural production caused by the lack of overall plans conforming to the objective realities. Historical experiences and lessons tell us that in guiding socialist agriculture, if there is no overall plan, or if the overall plan is not built upon the basis of objective requirements and practicability and if there are no all-round arrangements for the various departments and aspects of agricultural production, our agricultural production can only fight a chaotic battle from beginning to end and act as it thinks fit. It is thus necessary to attach importance to the current investigation of agricultural natural resources and the agricultural economy and further formulate the natural economic divisions in agriculture. Only in this way can we build plans for agricultural production on a scientific foundation and truly act according to natural and economic laws.

The overall plans for agricultural development include the various aspects of agricultural production and construction. However, this all-round development of socialist agriculture is essentially different from the "small but comprehensive" small peasant economy. Its content and scale cannot be matched by the small peasant economy. In addition, it does not implement the sealed up economic system of "not relying on others in anything." We must gradually implement regionalization and specialization in production. However, we must not directly transplant the layout of "corn belt" and "wheat belt" in the United States. In the United States, one particular crop is planted exclusively within the boundary of several states. Although this helps raise the labor productivity, there is no rational use of the natural resources. High demands are set for communication and transportation and the power of resistance against natural disasters is relatively low. We should not adopt this form of planting a single crop but should, in all-round development, bring out the key point and under the prerequisite of all-round development, implement the policy of adaptation to local conditions and suitable concentration.

In charting overall plans for agricultural development, it is necessary to take the setting up of a rational agricultural, ecological system as its major goal. However, this ecological system must be a combination of transforming and protecting nature. We object to the indiscriminate opening up the extravagant use of natural resources. However, this does not mean that we should preserve primitive natural conditions. There is no development of agricultural production which does not entail a transformation of nature. Some people estimate that in the primitive period of plant gathering and hunting with a passive use of nature, the natural resources in the whole world could only support about 10 million people. If the "natural ecological balance" could not be touched, as some comrades think, we would still be on a level with the wild beasts at the moment. In fact, primitive agricultural production starts with disruption of the old ecological balance and the constant setting up of a new ecological balance. For a very long time, since people have not truly grasped the laws of nature man's victory over nature often tends to provoke reprisals from nature. We must seriously bear these experiences and lessons in mind. But seen from the development of history, the occurrence of such conditions is unavoidable in a certain sense.

Second, It Is Necessary to Vigorously Develop the Rural Commodity Economy

Socialist agriculture cannot be built upon the foundation of a self-supporting economy. A self-supporting agricultural economy cannot meet the needs of the development of a socialist national economy and the daily increasing demands on agricultural products brought about by the improvement of people's livelihood, and cannot accumulate the capital required by expanded reproduction and modernization of agriculture itself. Only by vigorously developing production of commodities in the villages is it possible to shatter the self-sealed state of small scale production, bring about an unobstructed economic link between the various places and production units so as to truly activate the rural economy and enrich the communes, brigades and peasants. After the cooperative movement in agriculture, there would be a great development of the commodity economy

in the countryside in our country. However, in the early period of the people's communes, Chen Boda and his ilk negated the law of value and advocated the abolition of commodity production and monetary exchange. In the Great Cultural Revolution, Lin Biao and the "gang of four" associated commodity production and monetary exchange with capitalism. They attacked these with full force, thus bringing about a serious setback to the development of a commodity economy in the countryside in our country. The ultraleft pernicious influences have not been eradicated up to now and some of our comrades dare not boldly and openly develop the rural commodity economy. At present, the commodity rate of agricultural products in our country is very low and agricultural production is still in a self-supporting and semi-self-supporting condition. The relationships of exchange between the various districts, communes and brigades are very underdeveloped. This is a salient problem in the development of agriculture and the national economy in our country. Active development of commodity production and commodity exchange has already become the key in activating the rural economy.

Under the present conditions, there are still too many conventions restricting commodity production in the countryside, and there are insufficient concrete measures to promote rural commodity production. Many existing questions involve the present system and policies concerned. If these problems are not solved, it will be very difficult to greatly develop the rural commodity economy. We think that the state should not exert too rigid a leadership or too tight a control over the minute details in the planning of management so as to give impetus to the development of the rural commodity economy. The communes and brigades should be allowed a certain degree of flexibility so that the peasants can have their hands and feet unfettered and broadly implement methods of production and earning money. They can then, under the guidance of state plans, strive to raise the commodity rate of agricultural products sold to the state as well as energetically develop agricultural and subsidiary products outside the development plans in accordance with the demands of domestic and foreign markets. In the management system, the collective economy of communes and brigades should be allowed to process and sell the agricultural and subsidiary products they have produced. The people's communes in the countryside should be allowed to own their processing plants. They should also be able to gradually set up their own commercial organizations so as to integrate production, supply and consumption and comprehensively develop agriculture, industry and commerce. At the same time, under the prerequisite of guaranteeing the superiority of the collective economy and the domination of collective productive labor among commune members' encouragement and support should be given to commune members in the proper management of their private plots and domestic sideline occupations and active development of commodity production. It is necessary also to make use of trade fairs and other channels to promote economic transactions between various places and communes and brigades so that each make up what the other lacks, shatters the condition of mutual isolation, and activates the entire rural economy. In the policy of prices, it is necessary to follow the demands of the law of value, and on the basis of investigation

and research, gradually chart a rational price system of agricultural subsidiary products and reduce the "disparity" between the prices of industrial and agricultural products. In procurement work, it is necessary to adhere to the principle of exchange at equal value, prevent selling at a lower grade and lower price, so that the peasants can find compensation for their labor as well as gain true profits for the sale of their agricultural subsidiary products. In addition, the state should give the necessary support and the departments of finance, industry, transportation and other departments should conform to the development of the rural commodity economy.

Third, It Is Necessary to Emphatically Increase the Degree of Intensification of Agriculture

Seen from the trend of agricultural development in the world, intensive farming is the common orientation for agricultural development in various countries. Our country's main trend in traditional farming is also intensive farming. The characteristic is the great participation in active labor and in agricultural technology. It is intensive cultivation. Although the tradition of intensive cultivation was born on the foundation of small peasant economy, it is the crystallization of the wisdom and experience of the working peasants in our country. These many techniques and experiences are worth studying today. The orientation of development by raising the per-unit yield through intensive and meticulous management still conforms to the conditions of a large population and limited cultivated land in our country today, and cannot be simply disparaged as an "old path." The outstanding tradition of intensive cultivation in our country should be inherited and developed, but it is necessary to basically change the backward conditions of building traditional agriculture in our country on the foundation of manual labor and partial use of draft animals and the experiences of direct perception and the extremely low productivity of labor, Marx had pointed out, "An unquestionable and universally known fact is that progress in agriculture itself tends to be manifested in the relative increase in constant capital over variable capital." (Marx: "On Capital," People's Publishing House, 1975, Vol 3, p 857) Seen from the actual conditions in our country, although the increase in the degree of intensified farming requires more participation in active labor for a considerable time, the conditions of feeding 800 million peasants must be changed. Modern agricultural and scientific technology will be more and more widely applied and there will be more additions to the modernized agricultural means of production. Therefore, we should not slacken the transformation of agricultural technology just because of an abundant rural labor force in our country. Seen from the experiences of some advanced agricultural units at home and abroad, particular emphasis should be put on the popularization and study of agricultural scientific and technological knowledge at present. This is an important measure with a small investment but quick and great results in developing socialist agriculture.

Since our country's economic foundation is weak and the natural conditions and cultivation system are complicated, it is much more difficult to carry out agricultural mechanization than in some countries in Europe and America. We can only carry this out systematically in stages. Some comrades suggest that we can first put the key point in agricultural modernization on the modernization of biological and technological measures while simultaneously carrying out selected mechanization and then implement all-round mechanization. We think that this view can be taken. In agricultural mechanization in our country, a problem which must be solved is how to integrate agricultural mechanization with the tradition of intensive cultivation, mechanization must help intensive cultivation and improvement of per-unit yield; otherwise, it will lose its vitality on the soil in China. Certainly, this does not mean that agricultural mechanization should one-sidedly conform to agricultural technology and the system of cultivation: however, agricultural mechanization and agricultural technology should conform with one another. Mainly, traditional agricultural production and technology and the cultivation system in our country formed under the conditions of manual labor should not and cannot be invariable.

What we have to build is a modernized socialist agriculture. The building of a modernized socialist agriculture is precisely the process in which the backward management form and ideology of small peasant economy are gradually overcome. In this process, by absorbing the rational factors in traditional agriculture in our country, discarding the unreasonable portions, learning from the merits of modern agriculture in other countries under the guidance of the spirit of the two documents of the party Central Committee on agriculture, agriculture in our country will emerge with a new outlook and advance with an unprecedently high speed.

CSO: 4007

GROWING NEEDS OF POPULAR, FINE RICE 'GUICHAO' DISCUSSED

'GUANGMING RIBAO' Comment

Beijing GUANGMING RIBAO in Chinese 14 Apr 80 p 2

[Text] Recently NANFANG RIBAO reported that the area planted this year to "Guichao" as the early rice crop in Guangdong Province had been increased from last year's 4.2 million mu to about 10 million mu, or one-third the total area planted to early rice. This is a heartening achievement in that province's spread of advanced accomplishments in agriculture. The principal breeder of "Guichao," the famous breeding specialist Comrade Huang Yaoxiang, has expressed some thoughts to a reporter from NANFANG RIBAO about the issue of how to obtain bumper harvests from large area cultivation of "Guichao."

Comrade Huang Yaoxiang pointed out that in order to realize increased yields in the growing of "Guichao" on large areas, it was necessary to cultivate it with its varietal characteristics in mind. In planting and tending it, definite attention had to be given both the season and early care. Once the seedlings had been transplanted, fertilizer had to be applied early and cultivation done early. This was a great trick of the trade in assuring increased yields. "Guichao" takes rather large amounts of fertilizer, and in making side dressings to either the early crop or the late crop, the application principle of "massive amount early in the season, restraint in mid season, and supplemental amount in late season" should be followed. If this key link of rational application of fertilizer is done right, infestations of disease will be discouraged and the incidence of lodging will be reduced, thereby allowing the rice to reach its full capacity for bumper harvest with consistently high yields.

Comrade Huang Yaoxiang said as well that proper irrigation is also very important. After the "Guichao" seedlings have been transplanted, there should be a shallow stand of water at first to promote early tillering of the seedlings; in mid-season, there should be long exposure to medium amounts of sunning to promote differentiation of the rudimentary panicles, to increase the effective number of grains, and to prevent uncontrolled growth in the late season there should be a maintenance of moist conditions

with both irrigation and drainage so as to firm up the panicles and the grains, and to prevent premature deterioration of the roots. Additionally, both disease and lodging have to be prevented, basically by stepping up the level of care, doing a good job of tending with fertilizer and water, and taking preventive measures against possible troubles. It is particularly important that excessive nitrogenous fertilizer not be applied during the mid stage of growth.

According to the GUANGDONG NONGMIN BAO, "Guichao," the superior Guangdong rice variety has spread to Sichuan, Guangxi, Guizhou, Zhejiang, Henan, Jiangsu, and Shaanxi provinces and autonomous regions for test cultivation, and per mu yields have been better than for other varieties. Last year, Hefu County in Guangxi planted "Guichao" as both an early and a late crop on more than 132,000 mu. The early crop produced per mu yield increases of about 140 jin as compared with other locally predominant varieties; and the late crop showed increases of about 100 jin. This year, "Guichao" was planted as an early crop on 250,000 mu, which is 44 percent of the total early rice crop area. Last year, "Guichao" was planted on several mu where rape had formerly been grown, and a single crop surpassed the "double program" to create record per mu yields of more than 1,600 jin. Plans call for the planting of more than 5 million mu to "Guichao" this year.

Instances in which remarkably high yields have been obtained following the spread of "Guichao" superior variety rice to large area cultivation demonstrate that conventional superior varieties of rice possess a very great potential for increased yields. If in the expansion of their cultivation, methods are adapted to local conditions and they are cultivated and tended with care, large increases in rice yields are possible. During recent years many places have put a lot of effort into the spread of hybrid rice, but insufficient attention has been given to the general spread of conventional rice varieties. This state of affairs has to change, and henceforth no matter whether hybrid varieties or conventional varieties, so long as increased yields can be obtained, every effort should be made to extend cultivation. However, while expanding the cultivation of any variety, there must be adherence to the principle of adapting methods to local situations with no "single solution for every circumstance."

Additional Information from 'NANFANG RIBAO'

Guangzhou NANFANG RIBAO in Chinese 27 Mar 80 p 1

[Excerpt] Heavy applications of base fertilizer (principally organic fertilizer and phosphate fertilizer) must be made to "Guichao" during its initial growing period, and early side-dressing of fertilizer (principally nitrogenous and phosphate fertilizer) must be done to boost tillering. Between 80 and 90 percent of the fertilizer should be spread on the fields during the initial growing period and within 15 or 16 days following transplantation of the seedlings, with application being completed no later than 20 days after transplantation. In this way, tillering of the seedlings

will be vigorous and they will smoothly enter vegetative growth with remarkable benefits for increased yields. Once the seedlings have begun differentiation of their young panicles, application of fertilizer is no longer necessary. Once the full heading stage has been reached, should leaf color be too light, a small application of quick acting nitrogenous fertilizer may be made.

'NANFANG RIBAO' Commentary

Guangzhou NANFANG RIBAO in Chinese 27 Mar 80 p 1

[Excerpt] The extension of "Guichao" rice to large area cultivation reflects the hopes of the broad masses of peasants for urgently required mastery of agricultural science and a hastening of development of productivity. The superiof variety, "Guichao" was bred in 1976. In 1977 and 1978, it began to be test planted and gradually spread throughout a few score counties in small area plantings, and in 1979 the area of its spread reached more than 4.2 million mu. This year, at one fell swoop, it was spread to about 6 million mu more than last year. Why has "Guichao" spread so rapidly? It is because with the planting of "Guichao" as an early crop, if good work is done in its cultivation and care, everything else being equal in production, it will produce increased yields per mu several tens of jin greater than the cultivation of other varieties of rice, and in many areas the per mu increases in yields amount to more than 100 jin. In some places, per mu yield increases reach 200 to 300 jin. When the peasant masses see with their own eyes that this superior variety of rice helps produce increased yields of grain on a large scale, they voluntarily spread its use. Every one of our comrades must understand that the spread of "Guichao" from test plantings on small areas to cultivation over large areas accords with the laws of the development of things, and is also a concrete manifestation of an excellent situation in rural villages. In some places yields have not been sufficiently consistent from the planting of "Guichao" as a late crop, and reduced yields have resulted in some places. It seems that the main reason for this is a question of cultivation skills. A summarization of experiences is required to increase understanding. We positively cannot have doubts on this account about the great significance of the spread of "Guichao."

An import task staring us right in the face at the present moment is extremely enthusiastic aid to peasants to grow "Guichao" to assure bumper harvests from its large area cultivation. There is a need for broad propagandizing of knowledge about the cultivation of "Guichao," and the training of skilled peasant mainstay cadres. There is particularly need for summation and spread of successful experiences and the lessons of some failures about local cultivation of "Guichao" so that the peasants will become acquainted with the characteristics of "Guichao" and grasp correct techniques for its cultivation. At the same time, the peasants should be reminded that if all conditions are ready within a single production unit, it is all right to plant "Guichao" as the principal early variety, but one

should not go too far in planting it. There should be no planting of a single variety to the exclusion of all others. Leadership cadres on all levels, including leadership cadres above the county level should seek advice from agricultural technicians and peasants to learn how to do a good job of planting "Guichao," so that they can gain the right to speak and the authority to give guidance. Recently, many leading cadres in Shaoguan Prefecture became experts as a result of experience in the cultivation of hybrid rice, and this was an important reason why they were successful in the cultivation of hybrid rice over large areas there. Their experiences merit our study. Only if every area strengthens and improves the leadership of the party will it be possible to plant 10 million mu of paddy.

Number of Seedlings Transplanted Per Mu

Guangzhou NANFANG RIBAO in Chinese 29 Mar 80 p 3

[Excerpt] Improvement of the colony structure of seedlings requires solution to three conflicts. First is solution to the conflict between the basic seedlings and the number of spikes. There is a general law that whenever a rice field is planted reasonably close, for every increase in the basic number of seedlings per mu, there will be a commensurate increase in the number of spikes; however, if a definite limit is exceeded, the transplanted seedlings will not necessarily become effective spikes. But the number of spikes are the principal foundation for quantity of yield; only by having a large number of spikes can there be a large total number of grains. Last year, in the planting of "Guichao" as an early crop in many high yield fields of our province, between 100,000 and 150,000 basic seedlings per mu were planted for the most part, with effective spikes numbering 200,000 to 270,000 and per mu yields of from 800 to 100 jin of grain.

Guangdong Brigade's Example

Guangzhou NANFANG RIBAO in Chinese 31 Mar 80 p 1

[Text] The Dongfeng Brigade of Ningxin Commune in Xingning County formulated a set of key measures for increased yields that were applicable to the local area by summarizing practical experiences and mastering the laws of growth for "Guichao." They were thereby able to produce a great bumper harvest of rice last year, with per mu yields in excess of 2000 jin from early and late crops of rice. Throughout the brigade, "Guichao" accounted for 70 percent of the area planted to early rice. For the late crop, "Guichao" amounted to a little bit more, with average per mu yields being 1,111 jin and 1,043 jin respectively, both of which were increases per mu of more than 50 jin over the previous year. For 13 production teams comprising the brigade, per mu yields for early and late crops individually exceeded 1,000 jin, with total yields and per unit yields both exceeding the highest levels in history.

The Dongfeng Brigade is the highest rice producing unit in our province, but for the past several years its production has not been consistent, principally because superior varieties ideally suited for planting as a late crop had been lacking, and because of the effects of the low temperatures of the "cold dew wind."

The year before last they test planted more than 100 mu of "Guichao" with excellent results. Last year, the entire brigade expanded cultivation of "Guichao" through great effort to 900 mu or three-eighths of the total area of paddy. Both the early and late crops produced bumper harvests. Last year many communes and brigades had reduced yields as a result of the "cold dew wind" and the effects of low temperatures, but the Dongfeng Brigade had increased yields. An important reason for this was their attention to mastery of the laws of growth of "Guichao," and their implementation of key measures to increase production.

First of all was cultivation of sturdy seedlings of the right age. This is a prerequisite for bringing out the bumper harvest characteristics of "Guichao." They paid attention to how thickly seeds were sown and to control of the sprouting period. They planted between 80 to 100 jin of seeds per mu of seedling bed, and density of seedlings transplanted from the nursery bed with soil around the roots to properly plowed and irrigated fields did not exceed 150 jin. The sprouting period for early crop seedlings was from 35 to 40 days; for the late crop it was 25 to 30 days and no longer than 35 days.

Secondly was early sowing and early transplanting. For last year's early crop this brigade began to plant seeds for "Guichao" on 10 February, and began transplanting at the time of Qingming [very early April]. Before the onset of the Grain Rain [about the third week of April], transplanting was virtually completed, 3 to 5 days ahead of previous years. Planting of seeds for the late crop began in early July with transplantation of seedlings beginning on 20 July and ending on 5 August. Given the same growth conditions, seeds planted between 2 and 5 July had a higher fruiting rate and higher yields than seeds planted on 15 July, and increased yields per mu amounted to 180 jin of paddy. In addition to strict management over the time for planting seeds for "Guichao" as a late crop, it is also necessary to give strict attention to the time for transplanting seedlings. Survey shows that increased per yields of from 80 to 90 jin resulted from transplanting at the end of July rather than during early August.

Third was reasonably close planting. In especially fertile fields, this brigade transplanted seedlings to section measuring 5 x 4 or 6 x 4 cun with three to four seedlings per section; in average fields, sections were 5 x 4 or 6 x 3 cun with four or five seedlings going into each section, or possibly a maximum of six.

Fourth was copious applications of base fertilizer with early side dressing. For each mu of paddy fields, this brigade put down between 80 and 100 dan

of manure of various origins plus 50 jin of phosphatic fertilizer as base fertilizer for its early crop last year. It also used 30 to 40 dan of liquid manure, 50 jin of concentrated ammonia water or 30 jin of ammonium carbonate as a top dressing of fertilizer. For the late crop, every mu received 50 dan of manure of various origins and 30 to 40 dan of rice straw as base fertilizer, plus 50 dan of concentrated ammonia water or 30 jin of ammonium carbonate as a top dressing. Following transplantation, side dressing of fertilizer consisted principally of either chemical fertilizer or manure water. For both the early and late crops, per mu applications of chemical fertilizer amounted to about 80 jin (ammonium sulfate). For the early crop, the method was "heavy early period applications; no applications at the end; and supplementary application in the middle period." For the late crop, it was "heavy early application, light late application, and supplementary application in mid season." For both the early and late crops quick acting nitrogenous fertilizer was applied about 7 days following transplanting. This was combined with cultivating and weeding of the fields. Between 12 to 15 days after transplanting, another heavy application of side dressing was made. This was also combined with weeding of the fields with still another supplemental application of fertilizer being made several days thereafter.

Fifth was scientific use of water. Since "Guichao" has high stalks and large panicles, there is danger of bacterial blight in mid season and danger of lodging late in the season. This brigade paid attention to scientific use of water, transplanting the seedlings to shallow water, used meager water during tillering, exposed the fields to drying at the right time, and maintained moist soil in the latter period. In this way, control was maintained over ineffectual tillering with development of the plants' root systems, and the prevention of lodging.

Sixth was prevention and control of diseases and insect pests. Each production team had three to five agricultural personnel in charge of predicting and reporting such matters.

Hua County's Experience

Guangzhou NANFANG RIBAO in Chinese 1 Apr 80 p 1

[Text] The Hua County CCP Committee has concentrated its energies on agriculture and the diligent implementation of the party's policies, and building from a county-wide 1976 grain output that surpassed the highest levels in history, it has steadily increased yields for 3 years in a row. Statistics from pertinent departments show total grain output in 1977 as 375.68 million jin, an increase over 1976 of 3.18 million jin. 1978 showed increased yields of 6.63 million jin over 1977; and 1979 showed increased yields of 17.51 million jin over 1978. Total increased yields for the 3 years was 27.32 million jin. In 1979 per mu grain yields increased from the 1,020 jin of 1976 to 1,110 jin. Of this, the increase in paddy rice was quite great with five crops in 3 years producing a total increased yield of 3.36 million jin, not counting a sixth crop in 1977 when there was a decline in production. Along with the steady rise in yields, continuous

growth also occurred in many aspects of management with the levels of distribution to commune members rising year after year. A comparison of 1979 with 1976 shows increased peanut yields of 5.42 million jin for an increase of 61.3 percent; an increase in the number of live hogs raised by 97,530 head, an increase of 29.4 percent; and an average disbursement to commune members of 155.21 yuan, an increase of 38.61 yuan.

That Hua County has been able to realize steady increases in yields for the past 3 years is attributable principally to its attention to the following matters:

First was attention to policies with an across the board institution of a system of responsibility for production. As of 1977, the county had already instituted in 80 percent of its production brigades a system of responsibility by each of its units (or individuals), and a system of responsibility for tending the rice fields that including criticism, comparison with others, rewards and punishments. Subsequently, the system grew from criticism, comparison, rewards, and punishments to a linking of responsibility for yields and for tending the fields down to the unit level, with rewards for production in excess of nors. Responsibility for tending the fields was assigned specific individuals with rewards for production in excess of norms or for care going to individuals. Brigades were the basic accounting units and rewards were given for production in excess of norms. Since the system of responsibility for production closely linked good or bad collective production to the personal welfare of the masses of the commune members, striking improvements occurred in producers' concern for production accomplishments, the efficiency of labor in production, and the quality of rural life.

Second was attention to scientific cultivation of the fields with increased production of grain per unit of area. In order to counter low temperatures and rainy weather for the early crop, and to avoid the "cold dew wind" for the late crop, nylon sheeting was used to grow seedlings over large areas in the first crop. During 1978, more than 30 percent of the area of the early crop throughout the county was transplanted to fields covered with sheeting; in 1979, it was more than 40 percent of the area of the early crop. At the same time, early maturing high yield varieties were used to regulate the time of planting of the late crop. Ever since 1977, the area planted to early maturing varieties has been between 60 and 70 percent of the late crop area so that most of the area of the late crop is in full head by the national anniversary [1 October], thus avoiding the "cold dew wind." During the spring busy season, manpower, animal power, and machines are concentrated to shorten the period required for seedling transplanting. Most of the area of the early crop is planted by "Qingming" [very early April] in that way, and the late crop is transplanted before the first week of August to gain from the season.

As regards the spread of superior varieties, Qingerai variety was planted over wide areas in 1977 and produced increased yields. At the same time,

tests plantings of a small quantity of "Guichao" were made, and after high yields were obtained, more test plantings of it were made throughout the county as a late crop. In 1978 3,300 mu of it was grown as an early crop, and it was spread to a large area as a late crop with a total of 110,000 mu being planted to it. This amounted to 30 percent of the late crop area. In 1979, both the early and the late crops consisted of locally predominant superior varieties with 180,000 mu being planted as a first crop and 200,000 mu being planted as a late crop, representing more than 60 percent of both the early and the late crop.

They also made great efforts in scientific farming and management, summarizing the six links to obtaining high yields from the planting of "Guichao" (sturdy seedlings at the right age in shallow water; reasonable close planting of young plants; shallow water at the early stage, exposure of fields to sunlight at mid stage, and drainage of fields but keeping them moist in final stage; skilled use of fertilizer with large amounts at the beginning and additional amounts at the end; guarding against and controlling diseases and insect pests; thorough ripening; and proper harvesting to increase grain weight). Understand both superior varieties and superior methods.

In order to assure fulfillment of the party's policies and programs, and in order to implement the various measures for increased yields, the county CCP committee gave attention to strengthening and improving leadership in agriculture. During the past 3 years, the county has used 60 percent of its cash reserves for agriculture. For every year since 1978, it has allocated 150,000 as a supplement to production teams for the purchase of nylon sheeting, and 2 yuan per mu for Chinese milk vetch (Astragalus sinicus) seeds for winter planting. Agriculture has first priority for supply of cement, steel, and lumber. At the same time leadership of grain production teams and less advanced teams. The county annually provides less advanced units with supplemental help in the form of a ton of chemical fertilizer. Beginning in 1978 a system of personal responsibility was set up for cadres in communes and brigades. In addition to doing the work of their own organizations, commune and brigade organizations have also sent cadres out to liaison points.

9432
CSO: 4007

QUESTIONS ON AGRICULTURAL LOANS DISCUSSED

China Agricultural Bank

Beijing RENMIN RIBAO in Chinese 13 Mar 80 p 3

[Text] Editor's note: Some readers wrote to report that, at the present time, many comrades are still not too clear about the nature and function of agricultural loans. This has affected the timely collection of the loan payments. They asked for clarification of the nature of the loans and related policies. For this, we have requested the Headquarters of the China Agricultural Bank to answer as follows.

In principle there is a difference between agricultural loans and financial appropriations for assisting the communes and brigades by the country. The source of agricultural loans is mainly from banks and credit unions absorbing village collective deposits and personal savings; this fund has to be guaranteed for withdrawing. This is basically different from the financial fund that, after being appropriated, need not be repaid.

Now, some comrades separate the making from the collection of a loan. They think making loans is to support production and collecting loan payment is not. Obviously this is wrong. Every year, in some places, loans are made but not recalled. The result is that it not only increases the debt burden on the communes and brigades, it also affects the capital turnover of the agricultural loans.

Agricultural loans are the important components of agricultural production funds. These loans are most effective only when they can be recalled on time for circulation. When communes and brigades don't have enough funds to purchase their means of production, banks and credit unions can make loans to them. According to credit loan principles and distribution policies, a loan for production expenses should be repaid by drawing from the production expenditure fund, a loan for production equipment should be repaid by drawing from the accumulation fund. Loans that a production team borrowed are debits to be repaid. This is to say that a loan should be repaid upon its maturity.

Increase of commune members' income should be built on the basis of production development. By drawing less or not drawing production expenses or accumulation fund, or paying less or not paying mature loans (including deposit for purchase in advance) to increase commune members' share is actually to "report false income and draw dividends from debits." In collecting mature loans, we should work according to policy. We should base on the repaying capability of the communes and brigades to make loan-paying through consultation and practicality. Communes and brigades capable of paying debits, especially those of high increase in production and income should make timely payments on their mature loans. In addition, they should repay part of the overdue loans provided the members' increasing income should not be affected. The few production teams whose production was decreased due to catastrophe, their income is less than expenditures and, therefore, they are not able to repay, should receive favorable treatment, payments should be postponed.

Jiangxi Province

Beijing RENMIN RIBAO in Chinese 13 Mar 80 p 3

[Text] The Agricultural Banks and credit unions everywhere in Jiangxi Province enthusiastically made agricultural loans and, at the same time, paid special attention in collecting loan payments. They have achieved great success. In 1979, a total of 460 million yuan of various types of agricultural loans were granted and 410 million yuan of mature or past due loan payments were collected. The amount of agricultural loans granted and loan payments collected and economic effect both topped the previous records.

All the Agricultural Banks in Jiangxi, while seriously supporting foodstuff production, greatly supported economic crops and industrial and sideline production in line with local conditions. Both production and income of the communes and brigades were increased. The collective economic force was strengthened. The Fourth Production Team of Bafang Brigade, Zhangqing Commune, Hukou County, borrowed a loan of 1,000 yuan from a bank last year, while working on grain production, and planted 200 mu of watermelons. They had an all-round harvest in agriculture, with an income of more than 10,000 yuan from selling watermelons alone. In addition to paying off the loan of that year, a loan of more than 5,000 yuan overdue from the previous years was also paid off.

Under the leadership of each level party committee and the government, each level of the Jiangxi Agricultural Banks insisted on actually going down to the communes and brigades for a thorough audit. Based on different repaying capabilities of different production teams and after going through consultation work, a practical and workable repaying plan was worked out to meet the satisfaction of the party committees, the production teams, and the banks and credit unions. Last year, the 12th Team of Hongyan Brigade in Dean County borrowed a loan of more than 4,300 yuan. The team originally planned to pay off in one payment after selling their early rice. After

the audit, the credit union relaized that the team did not have enough funds to pay off in one payment without affecting the fun for the expansion of reproduction. Based on this situation, the credit union decided to collect 3,000 yuan only. The rest was to be collected after the fall. Cadres of the production team were very satisfied and praised the banks and the credit unions for their practical concern for production development.

Nanjing Situation

Beijing RENMIN RIBAO in Chinese 13 Mar 80 p 3

[Text] According to a XINHUA dispatch from Nanjing, the Jiangsu Provincial Branch of the China Agricultural Bank last year after trying the method of "linking the deposits with loans and guarantee the balance" province-wide, funds of local agencies were raised, funds were managed and utilized better, and the turnover of the funds for agricultural loans were speeded up. As of the end of last December, village deposits in the entire province reached 2.460 billion yuan, 790 million yuan over the previous year. Agricultural loans made by banks and credit unions amounted to 1.4 billion yuan, 300 million yuan over the previous year, or an increase of 27.3 percent. Loans collected amounted to 1.353 billion yuan, 9.8 percent over the previous year.

In the past, agricultural credit loans were made based on the distributed quota. As a result, some villages following the development of agricultural and sideline production needed a large amount of funds and had a feeling of insufficient funds, peasants in other villages, on the other hand, had funds not being used. Every year, a lot of idled agricultural loans were uncollectable and funds to support agriculture were diminished. After adopting the method of "guarantee the balance," making deposit, making loans, collecting payment all were mobilized and the entire village finance work was managed well.

Local authority over agricultural loan management was expanded, local organizations were mobilized, and funds were positively managed well and utilized well. The special feature of balance guarantee is that deposits and loans are directly linked. With the condition of not breaking the balance, when there are extra deposits, the surplus can be used in making loans so long as there is a reserve for depositors to withdraw. The increased usable und can be used right away without upper echelon approval.

While each community should fully utilize its funds for agricultural loans to progressively support agricultural production, they should also seriously work hard to manage the balance of funds and solve the problem of temporary fund shortage among the local regions. The funds in each community and county of Jiangsu are not balanced. The time of seeding, planting, and harvest in Jiangsu is different from one place to another. In the same period of time, deposits and loans may differ from one another. This makes fund management possible. At the beginning of last year, Jiangsu Province arranged the funds for agricultural loans of 110 million yuan more by utilizing this kind of geographical difference and time difference.

Each community, while progressively managing deposits, also practically and timely grasped the work of making loans and speeding up the turnover of loans. Most areas in Jiangsu last year basically collected all the payments of that year's agricultural loans. Some areas even collected loans accumulated from previous years. The province-wide turnover of agricultural loans reached 2.7, 0.5 over 1978.

8953
CSO: 4007

POPULARIZATION OF SCIENTIFIC FARMING RESULTS IN BUMPER HARVESTS

Beijing GUANGMING RIBAO in Chinese 14 Feb 80 p 2

[Text] Yulin Prefecture in Guangxi has eight counties. Last year with an increase in the harvest of more than 10 million jin in the late crop in each of the counties the total grain harvest in the prefecture was up more than 300 million jin from 2 years ago. This was an increase of more than 7 percent, and total harvest and yield per mu were highest in history.

Acreage planted in early rice in the prefecture was down 100,000 mu from last year and late rice was down more than 10,000 mu. The early rice survived a late cold spring and 170,000 mu of late rice was flooded, with 20,000 mu of this yielding nothing. Later more than 1 million mu was affected by drought. Even though the early rice enjoyed better weather after heading and flowering, and the late crop did not suffer any major frost, dew, or wind damage, to get a bumper harvest under these conditions is to carry out the party policy, and arouse the enthusiasm of the masses, as well as to continue to raise the level of scientific farming. Last year there were 18 communes in our prefecture which increased harvest by more than 5 million jin, and 16 communes which increased by more than 1 million jin. The advanced models were: four communes which averaged more than 1,600 jin per mu for the year, 11 brigades which averaged more than 2,000 jin per mu, and 18 production teams which averaged more than 2,400 jin per mu. One of these, the Xu Production Team of the Beiliu County Liuma Brigade has yearly increased yield on its 54.2 mu of paddy field. Two years ago they averaged 2,510 jin per mu, an increase of 206.5 jin per mu. In the most productive field of 1.6 mu they set a new record of 1,522 jin per mu from a single crop. Although there are not many of these advanced models, they make us more aware of the importance of raising the level of scientific farming. Therefore, we have exerted great efforts to grasp the techniques and problems of scientific farming. Here we shall discuss some major methods and experiences.

1. Summarize Practical Experiences and Raise the Level of Awareness of Scientific Farming

Yulin Prefecture is a double paddy rice crop area with a lot of people and little land. There is only 7/10 of a mu per person. The per mu yield

reached 1,000 jin in 1974 and increased in 1975 but dropped in 1976. Many of the cadres and masses felt production had peaked out. They said, in the 1950's increases in production were due to changes in the system of ownership, and we were eating "revolutionary rice." In the 1960's increases were due to new and improved water works and planting of lots of green manure. We were eating "agricultural reconstruction rice." In the 1970's increases were due to the building of chemical fertilizer plants in all of the counties. We were eating "chemical fertilizer rice." They felt that learning from Dazhai, building terraced fields was not really worthwhile. Too many people and too little land. It is hard to increase production. Can our prefecture further increase grain production? How? Surveys were made by a team of the prefecture party committee. Especially in 1976 when the late crop suffered a large drop in yield due to a freeze, the main leading comrade of the prefecture personally walked to the agricultural science institute and meterological stations in the prefecture to gain an understanding of the situation. He went to the communes and brigades which always had high production and to Nanbu Commune of Bobai County which had increased yield in a disaster year to try to figure out the natural laws and the experiences of scientific farming. By continuously summarizing our experiences we have determined that if our prefecture is to increase yield we have to rely on the fields we already have. We have to attack the yield per mu, and the way to do this is by scientific farming.

In the process of determining the production plan for 1977, we conducted a survey and called a symposium of agriculture science technicians to analyze the conditions in Yulin Prefecture. Two things came out of this. One was that there was little unclaimed land that could be cleared, about 1,160 million mu of which only 500,000 could be used for paddy fields. The clearing would be difficult and take a lot of work. The other thing was although the average yield of available paddy fields was more than 1,000 jin per mu, there are still 2 million mu of paddy fields that average less than 800 jin. A lot more could be gained by bringing low yield fields to high production than by clearing new fields. From the 1950's to the 1970's our prefecture has been popularizing good seed stock. Each time a new good seed stock is brought out there is a new breakthrough in production. Especially in 1975 and 1976 when several test plots were planted with hybrid paddy rice and hybrid corn. Most of these test plots produced 200 to 300 jin more than the usual seed stock. This proves that it is possible to increase yield per mu by popularizing good seed stock. We also found out from the agricultural science technicians that by preventing rot damage to the early crop, cold dew, and wind damage to the late crop, as well as good use of chemical fertilizers, water management, and improved cultivation techniques we can also increase the yield. Crop protection workers pointed out that disease and insect pest damage was much higher in Yulin Prefecture paddy fields in the 1970's than in the 1960's. This proved that the prefecture grain production could be increased by 1 or 2 million jin by doing a good job of disease and insect pest prevention. After many studies we are even more convinced of the adage "scientific farming means more grain."

2. As Conditions Permit, Popularize Scientific Farming Techniques

For the past 3 years we had a good grip on scientific farming, energetically promoted the use of hybrid paddy rice and hybrid corn, as well as the purification and rejuvenation of the common seed stock. We have handled prevention and cure of disease and insect pests as well as growing the rice seedlings in a greenhouse, raising two sets of seedlings a period of time apart, using pellet fertilizer deep in the soil, and applying combined nitrogen, phosphate, and potassium fertilizer close to the roots. With these methods we got bumper harvests in 1977 and 1979. We began planting hybrid paddy rice in 1975. At first we planted Nanyou [0589 0327] but it was not as resistant as the Shanyou [3073 0327] variety, and did not ear out as well. In 1977 we planted primarily Shanyou. Two years ago the early paddy rice had 30 days of overcast and rain, and the entire prefecture was hard hit with rice blast. We discovered that Shanyou No 6 was more resiliant to rice blast and white withering. Last year more than 1 million mu of paddy field were planted in hybrid rice in the prefecture. More than 90 percent of this was planted with Shanyou. There was a large increase in both early and late rice crops. Two years ago when we were promoting hybrid rice, we did not pay enough attention to common varieties. In the past 2 years when making the most of hybrids, we also paid attention to planting and seed selection of common varieties. For example, in Luchuan, and Beiliu counties there were good results in rejuvenation and purification of normal varieties and imported common varieties. In Pingnan and other counties, some communes and brigades were designated as rejuvenation and purification units for varieties selected by the county. The results were excellent. Also in Pingnan County first class seed stock that had been selected and cultivated by the county agricultural institute was distributed to communes and brigades to be propagated and further distributed. This basically improved the seed stock, purified it, and produced a large increase in production. This all goes to show that hybrid varieties and the rejuvenation of and purification of common varieties to continue to provide production teams with a large amount of good quality seed stock is one means of increasing production that is both economical and effective.

Second is timely planting with a mixture of early middle and late maturing varieties to avoid root rot in early paddy rice and cold dew wind damage to the late crop. These are all threats to paddy rice in our prefecture. In the early and middle 1970's there were years when these caused 1 million jin in grain losses. We remember this lesson, and read the weather data for Yulin Prefecture, and came to realize what was the reasonable time to seed and plant early and late paddy rice, and when is a safe harvesting time. With timely seeding and planting and a proper mixture of early, middle, and late maturing varieties we have had good harvests.

Third is the proper use of fertilizer and scientific water management. People have said for a long time that "to have a crop you need water, to have a good crop you need fertilizer." They believed that if there were water and fertilizer then productivity would increase. Therefore, regardless of the

stage of growth, if fertilizer was available, it was applied. The overspreading of nitrogen fertilizer was most common. Last spring, we widely discussed the lesson we had learned 2 years ago when the early crop grew healthy plants, but had a decreased yield. We pointed out that in addition to the fact there were rainy days, the overemphasis on nitrogen fertilizer to the neglect of phosphates and potassium fertilizer and the application during the middle and late stages of growth kept the stalks green, affecting changes in the dry matter. All of this led to a decrease in yield. Therefore we have especially emphasized proper application of fertilizer and emphasized that directly applied fertilizer be used only in accordance with the plant growth, that late period fertilizer be applied as a side dressing, and that nitrogen, phosphate, and potassium fertilizers in proper proportions be used. We have also promoted scientific irrigation methods, all with excellent results.

Fourth is the promoting of a technique for combined prevention for the yellow rice borer, rice hoppers, and rice leaf rollers as well as rice blast and leaf blight. The year before last 3.3 million mu was affected by disease or insect pests. This has rarely been seen. We adopted primarily agricultural measures supplemented by chemicals. The spring flooding of the fields and early harrowing drowned the borers and fished out [overwintering] pathogenic bacteria [4016 5497 2702]; when soaking, the seedlings were carefully disinfected. The ridding of insects and diseases had good results. We also take care to select seeds of a disease and insect resistant variety, and use scientific water management and timely fertilization to further strengthen the resistivity of the plants and keep disease and insect damage to the lowest possible level to assure an increase in production and an abundant harvest.

3. Emphasize that Leadership Cadres at All Levels Study Agricultural Technology, Bring the Network of Four Levels of Agricultural Technicians into Play

Our prefecture has 150,000 agricultural technicians at four levels. They are the backbone of promoting advanced agricultural techniques. In May 2 years ago we decided on 13 advanced agricultural techniques to be popularized throughout the prefecture. Last year the prefecture agriculture bureau sent eight people to go down to three model sites for a long time. It sent 13 people to 13 contact points to handle different methods of promoting advanced agricultural techniques. The agriculture bureaus of the eight counties in the prefecture sent out 54 agriculture technicians to 29 model units to live with and learn from them. For the past year or more, the prefecture has, by various means, trained more than 655,600 agricultural leading cadres, agricultural technicians, and agricultural technicians engaged in production, which even further popularized new agricultural techniques. For example the raising of seedlings in hot houses and the raising of two sets of seedlings at separate times. Two years ago there were only 900 production teams that were doing this. Last year there were more than 2000. We still emphasize that prefecture, county and commune level cadres must take the lead in learning agricultural technology, and using the knowledge of scientific farming as one criterion of judging cadres. Prefecture and county leading comrades

should have 125 mu of experimental fields to work themselves, the secretary of commune party committees should have 2,500 mu of "directed fields" and there should be more than 400 mu of comparative experimental fields. The standing committee of commune party committees should have more than 8,000 mu of experimental fields for the 815 of them, and the more than 6,100 brigade cadres should have more than 19,900 mu of experimental fields to work themselves. This way the cadres will take the lead in planting "model fields" and "high yield areas" which will promote both good seed stock and good techniques. They will gain experience through practice, and more and more of the leading cadres will become "technicians" in the planting of hybrid paddy fields. They will learn scientific farming and will not be directing blindly, which is a positive factor in getting a bumper harvest.

Editors Note: What does it take to achieve a large increase in agricultural production? The experience of the bumper grain harvest last year in Yulin Prefecture in Kuangxi Autonomous region is a good answer. First the party policy must be carried out, and bring into play the enthusiasm of the broad masses. Second there must be scientific farming to have high per unit yield. To accomplish these two things, the crux lies with how much attention is paid by leaders. Beginning with the conditions of having little land and a lot of people, the leading comrades of Yulin Prefecture began working on the fields available, visited agricultural technicians, used water reasonably, applied fertilizer reasonably, used combined techniques for the prevention and cure of disease and insect pests, and achieved a large increase in grain production. Cadres of all levels on the agricultural front should take a good look at their experience.

9559
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DEVELOPMENT OF B-TYPE NONGJIN 2 STERILE LINE DISCUSSED

Huanggang HUBEI NONGYE KEXUE [HUBEI AGRICULTURAL SCIENCES] in Chinese No 10, 5 Oct 79 pp 14-17

[Article by Li Xingrun [2621 5887 3387] of the Department of Biology, Huazhong Normal College: "B-Type Nongjin 2 Sterile Line"]

[Text] Beginning 1974, test crossing with continuous backcrossing was conducted using the B-type Taizhong 65 sterile line as the female parent and medium-maturing late, geng [rice--] Nongzhong 2 as the male parent to produce Nongjin 2 sterile line. When covered with a bag, self-fertilization is zero. Colonies were regular and uniform. Between 1976 and 1978, test crossings of more than 200 combinations were conducted with a preliminary selection of more than 40 pairs of Nongjin 2 sterile line plant lines possessing a rather strong restorer capacity. Three lines have been matched together. Evaluation by numerous units in Hubei, Zhejiang, Jiangsu, and Anhui provinces has shown good response for Nongjin 2 sterile line. A briefing on the basics of the Nongjin 2 sterile line is provided below.

I. The Selection Process and Characteristics of Nongjin 2 Sterile Line

B-type Taizhong 65 sterile line was introduced into our country from Japan in 1972. It is an intermediate geng type with tall stalks, which make it unsuitable for use as it is. During the summer of 1974, B-type Taizhong 65 sterile line (originally known as BT-A) was test crossed and continuously backcrossed with a Nongjin 2 late geng variety in a breeding process as follows:

Autumn 1974 at Wuchang	BT-A x Nongjin 2	Numerous hybrid seeds harvested.
Spring 1975 at Mianyang	F_1 x Nongjin 2	Two pairs of 13 plants were grown. Hybrid stalks were quite uniform and slightly taller than the male parent. Individual plants with pale yellow anthers that did not split and with a zero fruiting rate under bag pollination were selected for backcrossing with Nongjin 2 male parents.

[continued]	F_1 x Nongjin 2	Plant numbers were 42081 and 42083. Pollen from the sterile plants was round and when treated with potassium iodide, reaction was similar to that of BT-A with between 10 to 15 percent of the pollen grains coloring.
Autumn 1975 at Miangyang	B_1 F_1	Three plants were grown. Plants were somewhat taller than the male parent; growth period was nearly the same; anthers were somewhat smaller than those of the male parent, their color was paler and they did not split; pollen shape was round; and when treated with potassium iodide, between 10 and 15 percent of the pollengrains put on color. The fruiting rate under bag pollination was zero. Plant numbers were 42011 - 1, 42011-2, and 42011-3. Nongjin 2 continued in use for backcrossing.
Spring 1976 at Lingshui	B_2 F_1	212 plants were grown. Plant height, growing period and other characteristics were substantially the same as for Nongjin 2. Anthers were light yellow in color and did not split; pollen was round in shape, and when treated with potassium iodide a color reaction took place in about 15 percent of the grains. The fruiting rate under bag pollination was zero. Nongjin 2 continued to be used for backcrossing.
Autumn 1976 at Wuchang	B_3 F_1	The area planted was 0.15 mu. Plant colonies were virtually identical with the exception of a few hybrid plants from mixed pollen (the result of a very small amount of pollen mixing in the backcrossing of numerous plants). As a result of strict rouging to eliminate hybrids, 18 jin of sterile line seeds were harvested.
Autumn 1977 at Wuchang	B_4 F_1	Propagation area amounted to 0.2 mu. Colonies were uniform, and sterility characteristics stable. 25 jin of sterile line seeds were harvested.
Spring 1978 at Lingshui	B_5 F_1	Propagation area was 2 mu. Sterility characteristics were stable and plant colonies were uniform. A lot of cloudy and rainy days occurred during the heading period so only 68 jin of sterile line seeds were harvested, translating into a per mu yield of 34 jin.

Autumn 1978 at Wuchang	$B_6 F_1$	Propagation area was 0.1665 mu. Sterility characteristics were stable; colonies were uniform; male parents grew profusely; pollen was ample; opening of the glume on the female parent was normal; and cross pollination fruiting rate was 33.1 percent. Harvest of sterile line seeds amounted to 28.5 jin.

When Nongjin 2 sterile lines and sterile free lines were grown for a season in situations where water and fertilizer were quite available, plant stalks were generally about 85 centimeters tall; grown as a second rice crop, plant stalks were about 80 centimeters tall. Photosensitivity was moderate. When sown in the summer in Wuchang, the period from sowing of seeds to heading was from 96 to 102 days. Sown in the winter on Hainan Island, the period from planting of seeds to heading changed to from 62 to 91 days as a result of fairly great temperature changes in different years. Nongjin 2 has short stems, compact plants, strong tillering, a high heading rate, rapid filling, good change in color late in the season, no choking at the neck, normal glume opening, coinciding flowering periods for the male and female parents, uniform heading, and the sterile line frequently exhibits a spreading of the female [portion; stigma] under bag pollination.

II. Experiments with the Propagation of Nongjin 2 Sterile Line

Four separate propagation experiments were conducted with the sterile line of Nongjin 2. (Three times in Hubei and once on Hainan Island.) The propagation that took place in the autumn of 1978 will be used here as an example. The area of the propagation field was 0.1665 mu and fertility was quite good. The sterile line was sown on 5 June and transplanted on 25 June. The sterile free line and the sterile line were sown during the same period. The ratio of female rows to male rows was 4:2. Transplanting specifications were 4 x 6 + 6 (cun) with rows of single plants running from east to west. On 5 July, 9 July, and 24 July, 2 jin, 2 jin, and 1.5 jin respectively of urea was applied as a side dressing. Water management alternated dryness with wetness. Both parents flourished and became strong. Each male and female parent plant produced 14.2 heads and copious amounts of pollen.

1. Growth Period for the Sterile Line and the Sterile Free Line

The vegetative growth period and numbers of leaves on the main stalk is virtually the same for the sterile line and the sterile free line of Nongjin 2. Sowing and transplanting at the same time basically insures heading at the same time. Flowering periods of the two lines may be made to coincide readily (Table 1).

2. Flowering Habits and Cross Pollination Fruiting Rate

Since high yields may be fairly easily obtained from the propagation and seed propagation of the sterile line of Nongjin 2, only crude observations

Table 1. Comparative Growth Periods for Nongjin 2A and Nongjin 2B with Different Years and Places Shown

1) 年份	2) 试验地点	3) 品种	4) 播种期（月/日）	5) 移栽期（月/日）	6) 始穗期（月/日）	7) 齐穗期（月/日）	8) 播种至始穗天数	9) 始穗至齐穗天数	10) 主茎叶片数
1976	11) 灵水	16) 农进2号A	12/9	1/14	3/11	3/18	91	7	
		17) 农进2号B			3/11	3/18	91	7	
1976	12) 吴昌	18) 农进2号A	5/30	6/17	9/ 2	9/10	96	8	
		19) 农进2号B			9/ 2	9/10	96	8	
1977	13) 吴昌	20) 农进2号A	5/30	6/22	9/ 8	9/15	102	7	
		21) 农进2号B			9/ 8	1/15	102	7	
1978	14) 灵水	22) 农进2号A	12/5	1/ 6	2/10	26) (刈株)	66	—	
		23) 农进2号B			2/10	27) (刈株)	66	—	
1978	15) 吴昌	24) 农进2号A	6/5	6/25	9/10	9/17	97	7	17.3
		25) 农进2号B			9/10	9/17	97	7	17.2

Key:
1) Year
2) Place of experiment
3) Variety
4) Sowing time (month/day)
5) Transplanting time (month/day)
6) Onset of heading (month/day)
7) Completion of heading (month/day)
8) Number of days from sowing until heading
9) Number of days from onset of heading to completion of heading
10) Number of leaves on main stem
11) Lingshui
12) Wuchang
13) Lingshui
14) Lingshui
15) Wuchang
16) Nongjin 2A
17) Nongjin 2B
18) Nongjin 2A
19) Nongjin 2B
20) Nongjin 2A
21) Nongjin 2B
22) Nongjin 2A
23) Nongjin 2B
24) Nongjin 2A
25) Nongjin 2B
26) Plants cut
27) Plants cut

were made of its flowering habits. Cultivated as single crop rice, it normally heads during September when days are clear and daily average temperatures are high. The sterile line begins to flower around 1030 hours, with the high point in flowering coming between 1230 and 1330 hours. By 1530 hours of the same day, flowering is virtually finished. On cloudy or windy days, the time of flowering is delayed until 1300 hours, and the end of flowering is delayed until 1630 hours. The flowering time each day for the sterile free line is roughly 20 minutes earlier than for the sterile line. The high point of the flowering times each day for the two lines basically coincide.

The cross pollination fruiting rate is also heartening. The sterile line of Nongjin 2 has regular heads, normal opening of glumes, a large angle,

and some of the stigmas open outward. The sterile free line shows vigorous growth, averages 14.2 heads per plant, and has copious pollen. When pollination is artificially assisted, the cross pollination fruiting rate averages 33 percent and may go as high as 55.2 percent. During 1978 in a propagation field with an area of 0.1665 mu, actual yield of sterile line seeds amounted to 28.5 jin, the equivalent of a per mu yield of 172.4 jin. The yield configuration was 12,500 plant holes per mu with 16.8 panicles per plant hole (totaling 210,000 panicles per mu), with 116.8 grains per panicle, fertility of 38.6 grains, and a weight per thousand grains of 26 grams.

3. The Restorer Line for the Sterile Line of Nongjin 2

During the past several years, test crossings of more than 200 combinations have been done with Nongjin 2A. In 1978, 138 pairs of test crossings were done with 32 of them having fruiting rates in excess of 80 percent. This amounted to 23.2 percent of the combinations test crossed. All of these restorer plant lines were progeny of hybrids. There were xian and geng progeny and there were also crosses between geng and geng progeny. Among the xian-geng progeny crosses, some carried the IR strain. Hongzaonuo (an xian glutinous) and Yuhong 1 (geng) were effective restorer lines for Nongjin 2A. But the growth period for the former was too long when bred with a hybrid. By way of getting a match with a hybrid that would have both heterosis and a suitably long growing period, we made some hybrids of Hongzaonuo and Yuhong 1. The resultant "Hongyu" was selected from among the xian-geng hybrid progeny. From among the F_2 of "Hongyu" was selected 52 different plant lines for test crossing with Nongjin 2A, among which 15 had a fruiting rate in excess of 80 percent. These 15 amounted to 28.8 percent of the total. Twenty-three, or 44.2 percent of the total, had a fruiting rate between 50 and 80 percent. Those with a fruiting rate of less than 20 percent numbered only one, or 1.9 percent. This demonstrates that the transfer of restorer factors by breeding is possible using the methods of artificially creating a restorer line.

4. Realization of a Hybrid Through "Crossing Nongjin 2A with C57.

In 1978 more than 80 mu of land were test planted for the first time to a hybrid geng-xian resulting from the crossing of "Nongjin 2A with C57" in Hubein, Zhejiang, and Jiangsu provinces. Results seem ideal in every way. In the case of the 2.8 mu test which triple cropped three hybrids (hybrid rape, hybrid early rice, and hybrid late rice high-yield tests) planted by a brigade of the Xishui County Agricultural Bureau in October, late rice yields averaged 1,089.4 jin per mu, higher than the locally predominant late geng, Jianong 14, and also a 37.9 percent increase in yields over Ewan 3 (790 jin per mu).

In comparative tests on small areas under conditions of medium fertility, the "Nongjin 2A x C57" showed yields equivalent to 1,112 jin per mu, an

increase of 25.5 percent over the comparable Ewan 3 (886 jin per mu). Principal economic chracteristics are shown in Table 2.

Table 2. Comparison of Yields from "Nongjin 2A x C57" and Ewan 3 and Principal Economic Features

1) 表2 "[illegible]A×C57"与对比3号产量及主要经济性状比较

2)	3)	4)	5)	6)	7)	8)	9)
10) [illegible]A×C57	82	10	22.7	101.2	129.8	14.3	26.6	1112
11) [illegible]	88	9	16.8	88.2	78.4	11.2	26.8	886

12) "[illegible]×C57"为4×6寸双本插，[illegible]为4×6寸单本插。

Key:
1) Table [title]
2) Plant height (cms)
3) Number of panicles per plant hole
4) Panicle length (cms)
5) Total number of grains per panicle
6) Actual number of grains per panicle
7) Empty hulls
8) Weight per thousand grains (grams)
9) Per mu yields (jin)
10) "Nongjin 2A x C57"
11) Ewan 3
12) "Nongjin 2 x C57" has two plants per a 4 x 6 cun [transplanting hole]; Ewan 3 x 4 x 6 cun has a number of plants per a 4 x 6 cun [transplanting hole]

The tests also show that when "Nongjin 2A x C57" was sown between 10 and 30 June and transplanted between 14 and 27 July, heading began prior to 7 August and was complete prior to 12 September with maturation occurring in the middle of October. The shortest period of growth was 112 days and the longest 131 days (see Table 3). When the sowing period is somewhat delayed, an early crop may be obtained; consequently, in our province, as well as in other regions along the mid- and lower-reaches of the Chang Jiang, it is suitable as a late rice in double cropping.

Table 3. Effect on Vegetative Growth Period of Different Times of Sowing "Nongjin 2A x C57"

1) 表3 不同播植期对"农锦2号A×C57"生育期的影响

2) 种植地点	3) 播种期(月/日)	4) 移植期(月/日)	5) 秧龄(天)	6) 始穗期(月/日)	7) 齐穗期(月/日)	8) 成熟期(月/日)	9) 全生育期(天)
10) 武昌(洪山)	6/10	7/23	43	9/3	9/10	10/20	130
11) 武昌(洪山)	6/21	7/14	23	9/4	9/10	10/20	121
12) 武昌(洪农)	6/22	7/24	32	9/5	9/ 8	10/30	131
13) 孝感	6/20	7/10	20	9/4	9/ 8	10/10	113
14) 五三农场	6/10	7/23	35	9/5	9/10	10/15	110
15) 洪湖	6/20	7/20	25	9/5	9/11	10/10	114
16) 浠水	6/10	7/27	30	9/5	9/ 8	10/20	130
17) 鄂北农科所	6/20	7/20	26	9/5	9/12	10/20	112

Key:
1) Table [title]
2) Place planted
3) Time of sowing (month/day)
4) Time of transplanting (month/day)
5) Seedling age (days)
6) Onset of heading (month/day)
7) Completion of heading (month/day)
8) Maturation date (month/day)
9) Total growth period (days)
10) Wuchang (Huashi)
11) Wuchang (Huashi)
12) Wuchang (Huanong)
13) Xiaogan
14) Wusan Nongchang
15) Honghu
16) Xishui

9432
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NATIONAL SYMPOSIUM STRESSES WATERHEAD FOREST PROTECTION

OW260642 Beijing XINHUA Domestic Service in Chinese 0116 GMT 25 Apr 80

[Excerpts] Kunming, 25 Apr--At a recent national symposium on ecology in Kunming, Wu Zhonglun, vice president of the Chinese Academy of Forestry said: "To protect waterhead forests [shui yuan l n 3055 3293 2651] is to protect the lifeblood of agriculture. Soil erosion resulting from the damage of waterhead forests is a serious problem in our country's mountainous areas."

This forestry expert outlined our country's climate and forestry development. He said: Our mountainous areas account for 66 percent of the country's total area. As a result of forest destruction and arbitrary land reclamation, the total area subject to soil erosion in China is 1.5 million square meters. The annual soil loss amounts to some 5 billion tons, equivalent to the loss of all nitrogen, phosphate and potassium fertilizers produced by the country in an entire year.

Wu Zhonglun also said: Forests in important waterhead areas are of greater value in conserving water and soil than in supplying lumber. Regrettably, in addition to frequent forest fires, in many localities it is still common practice to arbitrarily fell trees, reclaim land and graze cattle. Even waterhead forests cannot escape damage, which if followed by punishment from nature.

In his speech, Wu Zhonglun stressed: Irrigation is the lifeblood of agriculture and waterhead forests are the lifeblood of irrigation. Vigorously protecting waterhead forests is one of the important factors in maintaining the ecological balance and insuring stable and high yields.

Therefore, he suggested:

1. To designate national and local waterhead forest zones for protection on the basis of a national agricultural resources survey and to issue a formal decree governing their protection.

2. To step up propaganda and education, particularly among leading cadres in production at all levels, so they will not wantonly put forward any slogans or measures harmful to production in mountainous areas.

3. To resolve the energy problem in the countryside, implement "the forestry law"; resolutely check the felling of trees, land reclamation and the willful grazing of cattle; and strengthen forestry protection and fire prevention rules and regulations.

4. To change the practice of stressing engineering measures to the neglect of ecological measures in building water conservancy projects.

5. To step up scientific research in waterhead forests and to attach importance to popularizing the results of this research.

CSO: 4007

GUARDING AGAINST BAD WEATHER CONDITIONS URGED

Rural Cadres Urged

OW292057 Beijing XINHUA Domestic Service in Mandarin 1306 GMT 29 Apr 80

[Text] Beijing, 29 Apr--The Central Meteorological Observatory in a recently issued weather report called on the broad masses of rural cadres and commune members to pay attention to the following task: After the "spring cold spell" has ended, it is still necessary to take measures to prevent any harm to agricultural production that may arise from unfavorable weather.

While analyzing the "spring cold spell" which had appeared in most of the localities from north China to the southern part of the Yangzi River this year, the Central Meteorological Observatory pointed out that such current weather as the slow rise of spring temperatures and the continued trend of that temperature, which is slightly lower than it was in previous years, has occurred three times since the founding of new China--1951, 1957 and 1970. The range of the 1980 "spring cold spell" is less than that in the above-mentioned 3 years, and its seriousness is less than in 1970, but equal to that of 1951 and 1957.

Owing to this year's "spring cold spell," early rice transplanting was delayed about 5 days in certain localities of Hunan, Jiangxi and other provinces. It has also slowed the growth of winter wheat in north China, delaying the jointing stage by about 7 days as compared with previous years. The "spring cold spell" has also affected the growth of vegetables and other crops in north and south China.

In accordance with the analysis of the weather situation, the Central Meteorological Observatory held that slightly cold temperatures and rainy weather may still appear in areas south of the Yangzi River in May, while the temperature in most winter wheat-growing areas of the north will remain close to that of the previous years or slightly higher. In accordance with different weather conditions, each locality should do a good job in field management of early rice and winter wheat.

Meteorological Official Comments

OW271254 Beijing Domestic Service in Mandarin 1200 GMT 26 Apr 80

[Text] In a recent interview with our station reporter, a responsible person of the Central Meteorological Station pointed out that low temperatures since the beginning of spring have adversely affected the production of summer crops. However, so long as we can take advantage of the favorable factors in the weather, do our utmost to overcome the difficulties and pay close attention to the management of the summer crops until they are harvested, there is still a great hope for a fairly good harvest this summer.

The responsible person of the Central Meteorological Station said: Low temperatures have prevailed in eastern China's agricultural areas for some time since the beginning of this spring. The temperatures in the first 10 days of February and the middle of March were 3 to 8 and 2 to 4 degrees lower respectively than those of the same periods in previous years. The temperatures in northern China and a great number of areas south of the Yangtzu River in mid-April were 1 to 4 degrees lower than the same period in previous years. The temperatures in the north of northern China were 3 to 5 degrees lower and are rising slowly. The temperatures in mid-April, which were just about the same as those in the first 10 days of April in previous years, have adversely affected the growth of winter wheat and vegetables in the north. The growth period of wheat crops has been delayed for about 7 days. Rainy weather, which has continued for over 20 days south of the Yangtzu River, has delayed the planting of early rice for about 5 days in some areas. It has also affected the growth of rape and green manure crops in the central and lower reaches of the Yangtzu River.

However, if we seriously analyze the favorable and the unfavorable weather factors in agricultural production, we will be able to take advantage of the favorable factors. For example, the unbroken spell of wet weather south of the river is not good for breeding healthy rice seedlings, but it provides sufficient water for transplanting the seedlings. The spring cool spell has delayed the jointing stage of winter wheat crops, but the wheat ears, after weathering, will bear bigger grains in the later growth stage. Moreover, although the dryness and frost damage have caused less shoots among winter wheat crops, creating difficulties for increasing production, we can still achieve the goal of increasing the total yield by taking advantage of the good air circulation and sunshine in wheat fields and concentrating our efforts on tending those crops with bigger ears, enabling each of them to bear over 1,000 grains.

The responsible person of the Central Meteorological Station said: For many years the vast numbers of cadres and communes in the countryside have accumulated rich experience in their struggle to combat natural calamities and wrest bumper harvests. With some 40 to 50 days before

the harvest of wheat crops, we can still expect a fairly good harvest of summer grains so long as we seize the time, take measures in accordance with actual conditions in each locality, strengthen field management, apply water and additional fertilizer on wheat crops during the jointing stage and concentrate our efforts on tending those with bigger ears.

The responsible person of the Central Meteorological Station added: In view of the delay in the growth of wheat crops and the unbroken spell of wet weather and possible dry and warm winds in the latter stage of growth this year, it is necessary to do a good job in making adequate preparations for dry and warm winds and preventing mildew and rot in harvesting and threshing caused by rainy weather. The early rice in the south may still be affected by low temperatures and a rainly spell in May. It is necessary to make adequate preparations in good time.

CSO: 4007

DISTRIBUTION OF, REASONS FOR FROST PERIODS STUDIED

Beijing DILI ZHISHI [GEOGRAPHICAL KNOWLEDGE] in Chinese No 11 Nov 79 pp 25-26

[Article by Lin Zhiguang [2651 0037 0342]: "Our Country's Frosts and Freezes"]

[Text] In most parts of our country, the severe cold of the winter season is by no means frightening. Since the crops from the land have either been harvested already or are wintering over in the earth, ability to resist the cold is very strong. In spring and fall, however, when the crops are in the process of growing in a warm environment, a sudden frost or freeze with low temperatures may cause severe freeze damage. From 10 to 12 April 1953, for example, not long after the winter wheat in North China had begun to elongate, temperatures suddenly plummeted in most parts of the entire country as a result of very cold air from Siberia, and in most of the wheat growing areas of the north, temperatures dropped to 1-3°C below zero, reaching 3-5°C below zero in quite a few places. A freeze pervaded a wide area and the harvest of the winter wheat crop alone was reduced by more than 5 billion jin. After this matter had come to the attention of Chairman Mao, he directed leading comrades in the Central Meteorology Bureau to frequently inform the people (in advance) about the weather situation, pointing out that the bureaucrats in the Juomintang did not care whether the people lived or died but that we cared about the people. Not long afterward, Chairman Mao and Premier Zhou signed an order removing the Meteorology Department from military control and placing it under a regional organization, clearly sipulating that meteorological work was both for the purpose of serving national defense construction and for the purpose of serving economic construction.

When Does the Land Frost Over?

Ours is a vast land with great variations in climate from east to west and north to south. At the northernmost Mo River Meteorology Station in Heilongjiang Province, each year on 7 September, on the average (at the end of August in the earliest year), frost appears for the first time. By the time of the national anniversary [1 October], the first frost has

advanced southward to the southernmost part of the northeast, and by early November, frost appears on both banks of the Huai River. By early December the line of the first frost enters the southernmost part of the Yangtze River Basin, and around New Year's time, the first frost arrives tardily in Guangdong and Guangxi. Hainan Island, Taiwan, Xishuangbanna and the islands of the South China Sea virtually never see frost.

In places where the first frost arrives late, the last frost arrives early, so the frost-free period gets shorter from south to north. The frost-free period at the Mo River Station averages only 91.0 days. This is the place with the shortest frost-free period in our country's eastern region below sea-level zone. In Dandong, and Shenyang in southern Liaoning Province, the frost-free period is about 50 days; on the North China Plain and on the Central Shaanxi Plain, it increases to more than 200 days; on both banks of the Yangtze it is as much as about 250 days; and in southern Fujian and in Guangdong and Guangxi provinces, it increases to 300 days or more. On the high plateaus of Qinghai and Tibet at 4,000 or 5,000 meters above sea level, the land is high and the weather cold. Even in summer frost and snow persist. At Geermuwudaoliang (altitude 4645.1 meters) in Qinghai, for example, and at Abaderuonrgai (altitude 3446.7 meters) in Sichuan Province, the average frost free period are only 10.1 days and 10.4 days respectively. At the Chengduo Qingshui River (elevation 4415.4 meters) in southern Qinghai, the number is only 9.6 days. Thus these areas really have virtually no frost-free period. It may be seen from this as well that the variation in the time of arrival of the first frost and the length of the frost free period is greater in the east-west direction than in the north-south direction.

Frost's Invasion of Sichuan Difficult

A popular saying has it that, "When snow strikes the high mountains, frost strikes the hollows." This is another way of saying that when there is much snow on the mountains, there is much frost in the hollows. This is because the rather dense cold air on the mountain slopes at night (cooled by its contact with the slopes that are radiating coldness) flows down the slopes to the bottoms of the river valleys and basins. Added to this is the constant radiation of coldness into the atmosphere by the valleys and river basins themselves. As a result, the temperature of the air at the bottom of low-lying topography on a clear night is particularly low, and freezing is especially severe. In test observations made in southern Guangxi, for example, though differences in elevation were only 20 to 30 meters, the lowest atmospheric temperature in the hollows was 3 to 5 degrees Centigrade lower than on top of hills and on slopes, and sometimes even greater. For this reason, rubber trees grew well on the top of hills and on slopes (particularly on the sunny slopes on the side away from cold winds), but rubber trees in low-lying areas frequently suffered severe freeze damage. Therefore, selection of suitable terrain is frequently an important condition that must be taken into consideration when planting rubber trees in South China. A place called Linz in Austria, to give another example, is located near the middle of a basin. On

21 January 1930, the lowest temperature tested in this basin was 28.8° below zero Centigrade, but on the top of a mountain slope nearby but only 80 meters higher, air temperature was 2.3°C above zero. This is such a classic example.

When, however, the area of the basin gradually enlarges, as for example the way the Sichuan Basin does with a length and breadth of more than 700 li, the situation becomes different. An even more important feature of the Sichuan Basin is its low latitude and its great quantity of clouds and rain, which greatly weaken cold radiation and the confluence of cold air accumulations at night. In fact, the situation is quite the opposite. Because the basin is surrounded by high mountains on all sides, cold air from the north is effectively blocked (in fact, freezes are also blocked) from entering the basin. Frost and snow are rarely seen in the Sichuan Basin, making it the warmest place for its latitude in our country during the winter season. Suining in the middle of the Sichuan Basin, for example, averages only 13.3 days of frost annually, while Wuhan at the same latitude to the east has 53.6 days. Suining has a frost period of only 60.6 days for the entire year, while Wuhan has 134.3 days. Luzhou in the southern part of the basin, as another example, has only 2.3 days of frost annually, and its frost period is only 12.7 days, but Changde in Hunan, which is at the same latitude, has 28.5 days of frost annually, and its frost period is 90.7 days. In fact, Luzhou and Yibinzhan on the southern edge of the basin have fewer frost days and a shorter frost period than Guangzhou and Nanning 600 kilometers farther south!

Consequently, on the climate map, the Sichuan Basin is an isolated area of slight frost. On the weather map, one can often see that as extremely cold air moves southward, though the frost and freezing line has already crossed the Nanling in the eastern regions and may extend to the seacoast of Guangdong and Guangxi and into the central part of Yunna, during the first several days of the cold wave, Sichuan remains an isolated frost-free zone because the Bashan, Qinling and Dalei ranges act as a screen that the cold air cannot easily penetrate. If the cold air that is moving southward is not too strong and there is no new cold air mass to join with it and reinforce it, the frost and freeze will not penetrate into the Sichuan Basin, and during this period of time the basin will remain frost-free. Thus, both the number of days of frost and the period of frost are naturally fewer and shorter than on the eastern plain.

Reasons for "No Frost Below Zero"

Close study of a map showing distribution of the number of frost days in our country will turn up some strange things:

First of all, frost is a rarity in arid regions. Take Golmo in the Tsaidam Basin at an elevation of 2,800 meters above sea level, for example:

Even though Golmo is much colder in winter than Anyang (75 meters above sea level), which is at the same latitude, the number of frost days is much less. Why? First of all it is because moisture is too scant in the arid regions of the northwest. Not even the cleverest housewife can cook a meal without rice, so without moisture how can frost form? Statistical data will demonstrate that whenever the average monthly relative humidity is lower than 25 to 30 percent, or in places or during months where the average monthly relative humidity at 0700 hours is lower than 40 percent, frost is rarely seen. So, if the number of days (and were there sufficient moisture, most of these days would have frost) where the ground surface's lowest temperature is $\leq 0°C$ are counted up, it will be discovered that the number of days in Golmo in which the lowest ground temperature $\leq 0°C$ will amount to 245.4, or far more than at Anyang, and the 306 day frost period will be vastly longer than at Anyang as well.

Secondly, the number of frost days in the frigid high mountains will be fewer, oddly enough, than at the foot of the mountains where air temperatures are higher. Let us take as an example a comparison of the Tianchi Meteorological Station in the Changbaishan at 2670 meters above sea level, with the Changbai Station at 711 meters above sea level at the foot of the mountain. Table 2 shows the paucity of frost days at Tianchi to be astounding, yet the relative humidity at the top of the mountain is the same as at the bottom of the mountain and the number of days of precipitation is also about the same; therefore, the main reason for less frost at the top of the mountain is related to the high winds. Under high wind conditions, frost cannot readily form.

Third, in places where the days of precipitation are numerous, frost days also tend to be few. Take Bijie in Guizhou Province, for example, where it is said, "weather is never clear for 3 days in a row." Here the average annual number of frost days is only 17.8. Because of precipitation (including rain, freezing rain, snow, and granular snow), even though air temperatures went below zero, there were 19.3 days on which no frost appeared. At the Huili Station in the southwestern part of Sichuan Province and to the west of Biji, because the weather is clear and bright with little rain or snow, there are only 2.1 days each year that are without frost because of precipitation.

What do these strange events tell us, and why do we want to bring them up?

Restoring the Original Distribution of Frost and Freezing

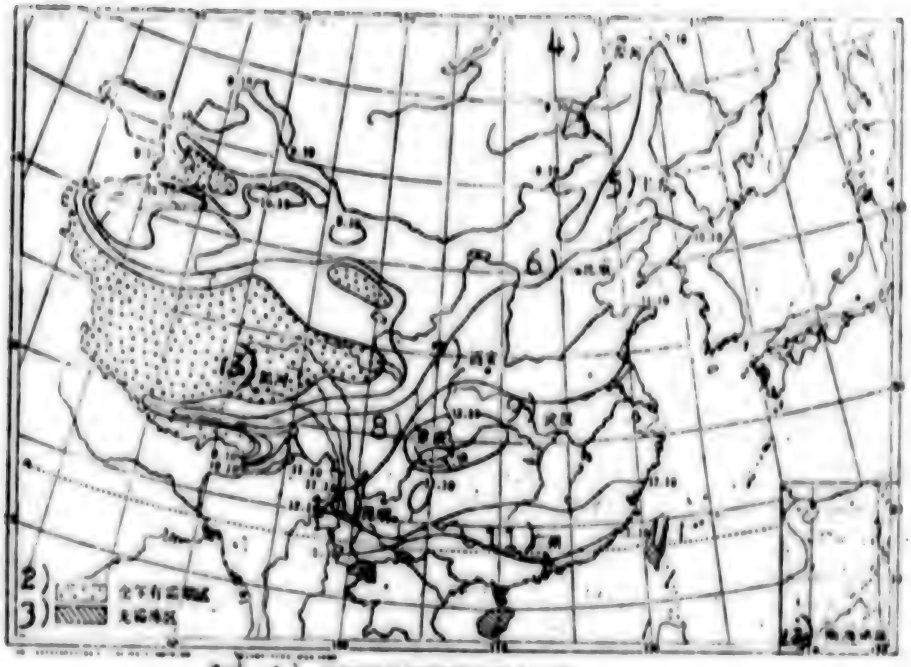
The occurrence of these strange events explain an important fact: when there is frost, there will be freeze damage to crops, of course. But when there is no frost, as for instance, when there is aridity, high winds, or precipitation, ground temperatures and air temperatures may fall below zero just the same and the crops may still suffer freeze damage. This phenomenon of freeze damage without frost is often called "black frost" to distinguish it from white frost. This is quite descriptive.

Therefore, in a country so vast with climates as complex and varied as ours, frost is not a complete indicator of freeze damage to crops. Our meteorological units also discovered long ago that frost as an indicator of freeze damage to crops was limited and one-sided; therefore, in weather reporting work, they relied more on lowest ground temperatures $\leqslant 0°C$ as an indicator of freezing conditions. This is more sensible since a drop in ground temperature below 0°C will mean generally that crops have already suffered freeze damage in varying degrees. If according to a tmermometer screen (1.5 meters high), the lowest air temperature $\leqslant 0°C$ is an indicator of freezing, that will be commensurate with a lowest ground temperature $\leqslant -3°C$ or thereabouts; thus standards are either on the high side or this is an indicator of heavy frost and freezing.

Still there is a problem in that the Central Meteorology Bureau has stipulated that each meteorology station must count and select the number of days of frost and the beginning of the frost period in its reports, and white frost is still the criterion. Consequently, the data collected on the number of frost days and the number of days from the beginning to the end of the frost period that appears in the data and on the climate maps published by the Central Meteorology Bureau means white frost. These data and maps are distributed far and wide, and users may very easily take them to mean the number of freezing days and the period that is free of freeze. Under many circumstances, this could be erroneous and lead to losses. This requires particular explanation.

Finally, let us use a map showing average annual distribution of days of first frost and freeze for our country by way of concluding this article. The criterion for first frost and freeze is the day on which ground temperature $\leqslant 0°C$ for the first time; the average first frost and freeze day is the average day on which ground temperature $\leqslant 0°C$ for the first time. In order to clarify the map and also take account of the effects of terrain, the tenth day of every month from September into January has been selected to give a total of five postings for the line showing the day of first frost or freezing.

The map shows that the time of first frost or freeze follows the latitude pretty well on the plains in the east with the line following virtually an east-west direction. In the western regions, the effect of terrain and elevation above sea level is extremely apparent with the line forming numerous enclosures. On the Qinghai and Tibetan plains and in the Tianshan, where elevations above sea level are highest, for example, even at the height of summer frost and freezing persist while in the balmy Sichuan Basin the average day of first frost and freeze may be as late as around the first of the year.



1) 我国平均初霜冻日期分布图

Key:

1) Map Showing Distribution of Average First Day of Frost or Freeze in Our Country
2) Frost all year round
3) Frost-free zone
4) Mo River
5) Changchun
6) Beijing
7) Xian
8) Chongqing
9) Wuhan
10) Kunming
11) Guangzhou
12) South China Sea Islands
13) Hei River

1) Table 1

	2)	白霜日数(天)	3) 无霜期(天)	4) 最冷月平均气温(℃)
5)	格尔木	13.7	225.0	-11.6
6)	安　阳	92.4	199.0	-1.7

1) Table 1
2) Number of days of white frost
3) Number of frost-free days
4) Average air temperature during coldest month (°C)
5) Gomol
6) Anyang

1) Table 2

	2)		3)	4)	5)	6)
7)	天池	7.9	178.0	68%	108.1	-23.8
8)	长白	174.1	18.6	68%	75.7	-17.7

1) Table 2
2) Number of days of frost
3) Number of days of high winds
4) Average relative humidity
5) Number of days of precipitation
6) Average air temperature during coldest month (°C)
7) Tianchi
8) Changbai

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CSO: 4007

THIRTY YEARS IN RESEARCH ON CHINESE DESERTS REVIEWED

Beijing DILI XUEBAO [ACTA GEOGRAPHICA SINICA] in Chinese Vol 34, No 4, Dec 79 pp 305-314

[Article by Zhu Zhenda [2612 7201 6671], Lanzhou Institute of Deserts, Chinese Academy of Sciences: "Thirty Years in Research Work on Chinese Deserts"*]

[Text] *Editor's note: Unanimity of understanding is currently lacking among the nations of the world about the sphere of research methods on "arid regions," wastelands," and "deserts." Broadly, all arid areas (including semi-arid areas, which occupy about one-third of the land area of the entire world and of our country) are the object for study. Secondly, all barren areas (including semi-barren areas, which occupy about one-fifth of the land area of the entire world and of our country) are taken as the sphere of study. Narrowly, sandy deserts (deserts in the narrowest sense), pebble and rocky deserts (the Gobi), as well as semi-arid deserts, which occupy about one-ninth of the world's land area, are meant. It was chiefly this latter conception that the desert control teams of the Chinese Academy of Sciences used to conduct their work. Additionally, some people lump together "deserts," "sandy lands," and "sand dunes," excluding all sand producing arid and semi-arid areas, but including sandy lands in moist and semi-moist areas. In this article, "desert" is used chiefly to mean sandy lands that are sandy wastes and semi-arid regions.

Desertology is a study that takes deserts (sandy wastes) as its object to study their formation, their growth, their natural characteristics, and their control. It regards "deserts" as totally integrated systems possessed of laws. Therefore, desertology is not simply a mixture of the discipline of geography, pedology, botany, meteorology, hydrology, agriculture, forestry, and livestock raising, but a new science that has grown out of the interpermeation and combination of each of these disciplines.

Sand deserts and pebble deserts (the Gobi), and salt deserts constitute the principal types of barren wastelands, but this article limits its discussion to sandy barren wastes (i.e. to sandy deserts) and to desertized land areas. Their area amounts to 739,700 square kilometers,[1] which is about 7.7 percent of the country's total land area, and includes moving sand dunes amounting to 62.4 percent, stationary or semi-stationary sand dunes amounting to 32 percent, and lands eroded by wind amounting to 5.6 percent. Prior to liberation, scientific research on such a large scale was rarely attempted, and such data as existed emphasized archeology and geology. Once the Chinese People's Republic was established, requirements for control of deserts placed numerous demands upon scientific research about deserts such as the source of the sandy material in deserts, the laws governing movement of sandstorms, the natural characteristics and natural resources of deserts, and various measures for the control of deserts, etc. Consequently, impetus was given to the gradual development of desert research. As of the present time, observations of each of the principal deserts of the country have been made, and a great deal of data accumulated, which has been compiled into maps showing the distribution of deserts throughout the country. The distribution characteristics, and kinds of deserts in our country have been substantially charted, and various methods for controlling the various kinds of deserts in our country have been proposed. In the area of control measures, preliminary recommendations have been made for control of sand damage (including railroads and farmlands) following scientific summary of experiences of the masses in controlling sand, and on the basis of experimental research at fixed site stations. Simultaneously, experiments in comprehensive utilization of sand have also been launched. Now we will explain under several headings, 30 years of research work and control of Chinese deserts.

1. Historical Review

Chinese desert research during the past 30 years may be divided into three phases.

Phase one: the period immediately following liberation until 1958, which was characterized principally by the launching of research on sand dunes in connection with planting of windbreak forests to stabilize sand in some regions. As part of the planting of a shelter forest against the wind in Shaanxi Province, research was launched on the Maowusu sand area in the Yulin, Jingbian, and Dingbian regions of northern Shaanxi,[1,2,3] with emphasis being placed on the source of sand in sand dunes, and the configuration and movement of sand dunes so as to explore means of controlling them. Aerial photography was also used to analyze the characteristics of sand dunes. In concert with construction of a forest shelter on the western side of the Northeast Plain, regular experiments were conducted on moving sands in the area of Zhanggu to the southeast of the Keerqin sand region. In conjunction with Baotou railroad line's passage through the southeastern edge of the Geli Desert, which is an area of shifting sands, experiments were conducted on the natural conditions (an embankment along the mid section) along the railroad right of way, on stabilizing the sands by using plants and mechanical stabilization.[4]

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1) This figure does not include the area of the Gobi.

Phase two: the period from 1959 to 1965, which was a phase of great development of desert study. In the year 1959 scientists and technicians in the sand control unit of the Chinese Academy of Sciences alone numbered more than 860 people. Research work was characterized principally by the launching of a general survey of natural conditions in deserts to meet requirements of desert control in areas of six provinces in the Northwest and in Inner Mongolia. Desert areas concerned were the Takla Makan Desert[5], the Guerbantonggute Desert[6], the Badanjilin Desert[7], the Tenggeli Desert[8], the Wulanbuhe Desert[10], the Kubuqi Desert[11], the Maowusu sand area[1], the Hunshandage sand area[12], and the Keerqin sand area[13]. Research done included the natural conditions in sandy areas, natural resources, changes in the deserts during historical times, characteristics of sand dunes, and laws governing movement of windblown sand. Methods included field observation and reading of aerial photographs.

Aside from the great amount of observation done during this stage, scientific research units in coordination with appropriate provincial, regional or production units, set up more than 20 desert experimental research stations such as those at Dengkou in Inner Mongolia, Minqin in Gansu, and at Shabotou in the middle of Ningxia. They also developed experiments with railroads and farmlands to prevent the depredations of sandstorms, and carried out some penetrating research on the natural characteristics of deserts, including the laws governing formation and shifting of sand dunes under the power of the wind, and changes in the moisture content of sand dunes.

Phase three: from 1965 until the present. With the completion of large-scale general survey work on the deserts, the work emphasis shifted to specialized research in working out vast construction tasks to control the depredations of the sand. Examples included experiments in measures to control sand damage to the Beijing-Tongliao, Lanzhou-Xinjiang[16], and Baotou - Lanzhou[17] railroad lines, including measures using irrigated plants to firm up sand and engineering techniques to control sand. Emphasis was given research on changes to natural conditions in sandy regions (like the Tarim River Basin) following their deployment, and to natural resources in water, soil and plants in sandy regions. Additionally, experiments were conducted in utilization of sandy earth in some experimental stations. Research was begun into shelter systems for farmlands in oases on the edges of some deserts. As far as methodology is concerned, in addition to on site experiments, simulated experiments on protective measures were conducted in wind tunnels on sandstorm electricity, downward wind deflectors, and shelter forests[19]. A smoke wind tunnel was used to study diagrams of the movements of air currents in the vicinity of different sectional road beds and forest belts. In recent years, high speed dynamic photography has also been used to study the movements of sand.

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1) Composite Observation Report on the Maowusu Sand Area by Geography Department of Beijing University, and the Maowusu Sand area Observation Team of the Bingchuandongtu Desert Institute of the Chinese Academy of Sciences, 1974.

Data from earlier observations of deserts and experiences in controlling sand in various places were also summarized during this phase with some writings being published. During recent years, study of deserts was also combined with environmental science to study the development of natural conditions that give rise to desertification problems in arid and semi-arid ecological systems. Research at the present time is involved with the natural and man-made elements that create desertification, the historical process and the existing process of desertification, and the characteristics and tendencies in desertification.[1)]

2. Major Accomplishments in Desert Research

The major accomplishments in Chinese desert research during the past 30 years are presented below:

(1) On questions about the source of sand in deserts, and laws governing formation, growth, and movement of sand dunes.

Research on the source of sand in our country's deserts is directly related to measures to control the deserts, but solution of this problem first requires consideration of the earth surface underlying sand dunes. Through analysis of deposits underlying sand dunes and the composition of sandy materials in sand dunes as well as the distribution characteristics of old river beds, old lakes, and hills and hillocks, the basic contours of the earth's surface before the winds formed sand dunes can be reconstructed, as for example in our country's famed Takla Makan Desert. The southern part of this desert is composed of a delta in the lower basins of rivers with sources in the Kunlun Mountains of which the dry deltas of the Huoshidake River and the Gelahashi River occupy the largest part of the southwestern Takla Makan. In the south central part of the desert lie the deltas of the Yulonghashi River, the Keliya River, the Niya River, the Yatonggusi River, the Andeer River, and the Kalamilan River. Of these, the dry delta of the Keliya River penetrates more than 300 kilometers into the desert. The eastern part of the desert is formed from the delta of the lower reaches of the Tarim River and the lower reaches of the Kongque River plus the lacustrine plain of Lop Nor. The northern part of the desert is an alluvial plain formed by the Tarim River in ancient times and in modern times. The old river bed of the Tarim River running from east to west toward Yanshen may be seen in the desert 80 to 100 kilometers south of the present river bed. The western reaches of the desert have been formed by the dry deltas of some river basins that rose in the Pamir and Kunlun mountains, rivers such as the Kashgar River, the Gaizi River, the Yerqiang River, and the Tuzinafu River. It is these alluvial plains and deltas that provide the large quantities of loose and deep sandy sediment (usually more than 100 meters thick), which under dry climatic conditions and when whipped by the wind turns into the source of the sandy material of the desert. A similarity exists between the high mineral content of the windblown sand of the desert and this underlying sediment. The southern part of the Takla Makan, for example, is made up principally of gneiss, schist,

1) Zhu Zhenda and Liu Shu [0491 1859], "Desertification--An Environmental Protection Problem That Merits Attention," 1979, mimeographed draft.

and phyllite, owing to the composition of the Kunlun Mountains. Consequently, the mineral composition of the windblown sands of sediment from the lower reaches of river basins originating in the Kunlun Mountains are very similar, with a hornblende content running from 30 to 72 percent followed by mica, epidote, and metallic minerals. In the northern part of the desert, the mineral composition of the sandy material in the Tarim region shows between 20 and 30 percent less hornblende content than in the southern part of the desert, and mica becomes the principal component (in excess of 40 percent), followed by epidote.

Similar characteristics exist in the other deserts of our country, as, for instance, in the Gurbantonggute Desert.[28] Its underlying surface consists principally of the alluvial plain and delta of the Bei and Lu rivers rising in the Tianshans, and in the western part of the desert the underlying stratum is the lacustrine plain of the Manasi Lake and the Dabasongnor Lake. On the basis of a comparison of the characteristics of the earth surface underlying sand dunes and the composition of the sandy material, the source of the sandy material in the major deserts of our country may be generalized as to its formation in the following several categories:

1. Alluvium from river basins: most of the Takla Makan Desert, most of the Guerbantonggute Desert, the Kubuqi Sandy Region, the northern part of the Wulanbuhe Desert, and most of the Keerqin Sandy Region.

2. Alluviam from river basins and lacustrine accumulations: most of the Badanjilin Desert and the Tengeli Desert, the southern portion of the Maowusu Sandy Region and the eastern Kulukekumu of the Takla Makan.

3. Diluvial deposits: the deserts in the Tsaidam Basin in the region at the foot of the Kunlun Mountains, and the deserts in the southern part of the Tarim Basin in the region of the northern slopes of the Kunlun Mountains and the Aerjin Mountains.

4. Eluvium and diluvium from weathered bedrock: North central and western part of the Maowusu sandy region; northern part of the Guerbantonggute Desert and the Kumudage Desert south of Hami. Study of the formation, growth, and movement of sand dunes under force of the winds is an important ingredient in desert control. In recent years, a large quantity of observation data on desert areas, particularly the use of aerial photographs of large areas, has provided beneficial conditions for investigating the formation, growth, and shapes of sand dunes. The results of study show:

1. The direction of alignment of sand dunes and the wind direction of the sand-bearing winds are identical in the main, but not entirely congruent. They have an angle of intersection. The size of the angle of intersection is related to the degree of complexity of the sand-bearing winds. In places where the wind direction is straight, the angle is usually between 5 and 15 degrees; therefore, through analysis of data on the wind at meteorological stations the direction of alignment of the sand dunes may be deduced, and contrarily the direction of alignment of sand dunes appearing on aerial photographs reflects the wind situation in the area photographed.

2. The overall shape characteristics of sand dunes in the desert is related to the degree of complexity of sand-bearing winds. Different shape characteristics and different wind indications are mutually homologous. In areas in which the wind comes from one direction, usually sand dunes have the crescent shape of a new moon, and form chains of dunes for the most part; where there are two cross winds with an angle of intersection that is not very large, crescent shaped ridges or simply ridges are formed.

The wind is an important element in molding the shape of the desert landscape, but it is influenced by the natural conditions prevailing in each place. For this reason, even though the wind indications may be the same, the sand dune shapes may vary. Moisture content and ground cover influences are particularly noteworthy. It must be pointed out here that the shape of shifting sand dunes on the edges of deserts and on semi-arid grassland areas are intimately related to man's activities that destroy plant cover and create a loss of balance in the natural ecological system. The cause of our country's barren prairies and patches of shifting sand in sandy parts of prairie regions lies here.

In order to grasp the laws governing movement of sandstorms, observations were made from fixed sites and semi-fixed sites of the structure of movement of sand storms and of the moving process of formation and development of crescent-shaped sand dunes on pebbled surfaces under the influence of the power of the wind.[29] [30]

(2) On the Question of Desert Changes in Historical Times

The formation and development of deserts have been principally the results of natural causes, but changes in deserts in historical times is closely related to human activity. Therefore, a study of desert changes in historical times is of major significance in understanding the tendencies toward change in the deserts and in rational development and use of natural resources in arid and semi-arid areas. Changes in the deserts in historical times may be capsulized in two broad categories:

1. Desert regions did not usually have similar desert landscapes. These types occurred chiefly on dry prairies and barren prairie areas. This was the result of human activities in historical times (such as excessive opening up of virgin soil, excessive pasturage, chopping down of forests, improper use of water resources, changing around of land management methods, and warfare), which destroyed the ecological balance of arid and semi-arid areas.

2. In places where deserts originally existed, as a result of the activities of mah during historical times including destruction during war of water conservancy facilities, large-scale irrigation in the upper and middle reaches of rivers, which consumed much water, and the chopping down of mountain forests that nurtured water resources in the mountains created a reduction in the quantity of water available and an accumulation of silt in the lower reaches of rivers. This resulted in changes in the courses of rivers, endangered the oases and natural plant covers that depended on the river waters for sustenance,

thereby causing the original desert to expand further as a result of sand being raised locally, or the invasion of sand dunes from elsewhere. Part of the changes that have taken place in the Takla Makan Desert and the Alashan Hexi Corridor in the barren regions of our country's west belong in this category.

Synthesis and analysis of on the ground field observations and historical archeological data supports this outline of the two types of desert changes [31] [32]. For example, during the 5th century A.D., in the southern part of the present day Maowusu sand area Helianbobo built Tongwan, the capital of a Xia dynasty. At that time this was no desert environment but "faced a clear lake, clean and flowing." By the 9th century, there already appeared "sand as high as the parapets," and by the 10th century, it had "plunged into desert." Historically, there have been rather frequent wars in this region, and land use (farm cultivation and livestock raising) has alternated too many times, accompanied by a regression in grasslands, opening the barren land to erosion by the winds and the destruction of plant cover to provide conditions for desertification. Particularly during the middle part of the Ming dynasty when virgin lands were opened near Changcheng, and during the Qing dynasty when opening of the land was done in the name of "settlers to the full boundaries of empire," and "making use of land to sustain the people," greater spread of the shifting sands was created in this area, with a growth in the desertification of the soil. Another example is in the north of the Wulanbuhe Desert and in the Keerqin sandy region where desertification of the soil took place principally from shifting sands, all within historical times.

The transformation of oases into desertified soil in the lower basins of some rivers in barren areas is almost always related to shifts in the river bed or changes in the water source. Improper irrigation gives rise to strong salinization, and actions by man such as warfare may also create deserts. The Juyanheicheng District in the lower reaches of feeble waters to the northwest of the Badanjilin Desert, and places such as Niya, Kalatun, Gupishan and Loulan at the lower reaches of the river basin on the edge of the Takla Makan Desert in the Tarim Basin are all testimony to desertification in historical times.

The above examples demonstrate that when future development of natural resources is undertaken in arid and semi-arid areas, there must be a determination of the direction of land use based on the characteristics of natural conditions with a fitting of methods to the local situation. Attention must be given to criteria setting limits on man's use of the environment and the natural potential as well as to dynamic equilibrium relationships among the systems of use of different types of soil; and to implementation of the principle of "use in moderation," while at the same time adopting relevant measures to control damage from sand.

(3) On the Question of the Natural Features of Major Deserts

It has been ascertained from the analysis of a large quantity of on site observations and aerial photographs that inasmuch as the territory of our

country's deserts is vast, there are manifest differences in the natural conditions in each desert. Our largest, the Takla Makan Desert located in the middle of the Tarim Basin is a hot and extremely arid wasteland where annual rainfall is less than 50 millimeters and where more than 60 percent of the moving sand dunes are more than 50 meters in height and are of complicated and varied shapes. There are pyramidal sand dunes, compound sand ridges stretching from north to south, compound sand dune chains, and dome-shaped sand dunes. But on the edges of the desert and along the shores of rivers flowing into the desert, as well as along the leading edge of the diluvial fan, where moisture conditions are better, diversiform-leaved popular (Populer diversifolia) forests and Chinese tamarisks (Tamarix chinensis) thickets grow in profusion to make a natural patch of green in the middle of the desert. In the case of the Guerbantonggute Desert situated in the Dzungarian Basin, annual precipitation amounts to from 70 to 150 millimeters and there are accumulations of snow in winter. Vegetation grows fairly well with sacsaoul (Holoxylon ammodendron) and white sacsaoul predominating. Fixed and semi-fixed sand embankments and sand embankments in the shape of beehives cover 97 percent of the desert's total area. In the Badanjilin Desert and the Tenggeli Desert, both of which are in the Alishan area, shifting sand dunes predominate. In the Badanjilin Desert, sand dunes more than 200 meters high occupy 6.8 percent of the desert, and there are quite a few lakes here as well, which give these two deserts a common characteristic. There are, however, differences in their landscapes. In the Tengeli Desert, about 80 percent of the lake basins are dry, but in the Badanjilin Desert, about 90 percent of the lakes are filled with water. Some of the sandy regions of the eastern region (places such as the Maowusu sandy region, the Hunshandage sandy region, the Keerqin sandy region, and the Hulunbeir sandy region are comparable to the deserts of the western region. There moisture conditions are fair with annual rainfall of between 200 and 450 millimeters. Additionally, there are quite a few rivers (or lakes), and underground water resources are abundant. Fixed and semi-fixed sand dunes predominate. In consequence of the irrational use of the land in the historical period prior to Liberation, plant cover was destroyed and the area of shifting sands increased, thereby forming today's crisscrossing panorama of shifting, fixed, and semi-fixed sand dunes.

The study of the differences in natural conditions among the principal deserts of our country has provided scientific data suiting methods to local conditions in controlling the deserts. In the sandy regions of the east, for example, a fundamental measure must be rational use of soil resources, protection of existing natural vegetation cover, building of shelter forests among the dunes, planting of plants on the outside of dunes to fix the sand where it is and to stabilize shifting sand, and the creation of shelter fields or forests or shelter pastures and forests in farmlands or pastures in the sandy regions to prevent damage from sandstorms. In the Takla Makan of the western region, in countering natural characteristics and sandstorm movement, the emphasis should be on construction of belts of shelter forests and protective fields and forests to prevent the encroachment of sandstorms, and on the edges of oases in green areas fanning out from them, natural vegetation (such as Chinese tamarisk trees) should be planted as protective screens. Production

policies that emphasize forestry and livestock raising must be adopted in naturally green areas of deserts with a strict prohibition against opening up the land to cultivation so as to prevent enlargement of the desert and the desertification of the soil.

(4) On the Question of Control of Sand Damage to Farmlands

One important aspect of 30 years of study of desert control has been control of sand damage to farmlands, about which much data has been accumulated, and about which the following several observations can be made from the principle of adopting measures to local situations and building defenses to meet the dangers.

1. In deserts at the edges of oases where the heights of sand dunes are not great (under 10 meters), and where there is low ground among the dunes with conditions that favor the introduction of water for irrigation, shelter forests against the sand may be created using a combination of forest belts and sand strips,[38] i.e., creation of a sparse forest belt running along a main canal at the edge of oases, while at the same time using surplus water or underground water for irrigation to create strip forests on the low ground in and around the sand dunes distributed inside the forest belt so that the sand dunes will be cut off and surrounded by the forest belt and the forest strips. In order further to stabilize the shifting sands within the forest strips, sand obstacles should be set into the surfaces of the dunes (things such as sand barriers of clay or barriers made of reeds or some other stalks and stems of plants) with plants (such as sacsaoul) being planted to hold down the sand inside the barriers.[39]

2. In oases at the edge of deserts where there is flat land made of soil, and when shifting sands are semi-fixed, shelter forests against the sand constructed of tall bushes or shrubs, with the bushes or shrubs facing the desert in order to weaken the force of sandstorms close in to the oases. On the basis of observation data from Pishan in Xinjiang, under moderate wind conditions there was a reduction of about 80 percent in the amount of sand in the airstream that had passed through a thicket of bushes or shrubs over that in an unobstructed airstream. Bushes planted along the side of cultivated land can further reduce or obstruct the amount of windblown sand. In the northeastern part of the Wulanbuhe Desert a fairly wide but sparse tree line was planted in conjunction with sand-trapping grass near an oasis. As a result, at a distance of about 30 times the height of a tree, windspeeds dropped an average of 50 to 60 percent, and 70 percent of the amount of sand carried by the air close to the ground was stopped in front of the forest belt.

3. In places where damage from sandstorms is paramount as at the outer fringes of oases in the sandy and pebbly Gobi, or in places eroded by wind, several rows of forests are usually used in combination with ditches to form a shelter forest belt against the sand. Long living and fast growing trees in a mixture of tall and short varieties are planted. In the Turfan, for example, wind speed at a place 1-3H distant from the rear of the forest (with 1-3H being a multiple of the height of the forest) was only 26.7 percent that of the open wind; and at a place 7H distant from behind the forest, it was 29 percent that of the open wind.

4. Along with the creation of shelter forests against the sand along the fringes of the desert, a network of fields and forests must be created within the oases to form an interlocking defense system. The experiences of the masses in controlling sand as well as data derived from observation shows that:[1] the use of narrow forest belts and small forest networks are most appropriate. In Turfan, the effectiveness of small grids in reducing wind speeds within the grid improved by 7.4 to 26.7 percent over that of large grids. On the edge of Takla Makan Desert, the distance between main forest belts at an oasis is from 200 to 400 meters, and the spacing of secondary forest belts is from 300 to 500 meters. Most belts consist of from four to six rows of trees or four to eight rows of mixed varieties of trees of various heights arranged in two tiers. The tiers are usually arranged along a ditch (or a road), one tree on each side of the ditch. In the configuration of forest belts, a sparse and pervious configuration and a configuration that allows passage of wind predominates. Experience shows that shrubs and bushes combined with a pervious forest belt is suitable in areas where sandstorm damage is quite severe, while in most oases configurations that permit wind to pass through at low speeds are best. Usually trees native to a place are used, supplemented with small numbers of long living varieties.

5. Control of sand damage on the fringes of oases must be coordinated with measures around the perimeter of the oases to grow sand-trapping grass and ground covers. In order to deal with some sand dunes on the perimeter of oases in Turfan in Xinjiang Province, sand-trapping grass was planted for many years, and following 3 years of winter irrigation of this grass, the amount of ground cover growing through the sand increased from a 20 percent area of coverage to in excess of 60 to 80 percent. Observation data demonstrate that with a coverage rate of between 80 and 85 percent, roughness of the ground surface within a grass trap belt made up of camel thorn is increased 40 fold over wind abrasion of the ground outside the belt, and ground level wind speed is reduced by 47 percent over what it is outside the belt. This effectively functions to prevent the blowing of local sand, and obstructs incursion of sandstorms from elsewhere.

6. With regard to shifting sands near farmlands or pasturage on barren prairies or dry prairies, so-called "stop in it front and pull it from the back" methods are used to fix shifting sand when the sand dunes are fairly low, spaces between dunes fairly wide, and annual rainfall is usually around 200-450 millimeters.[40] This method calls for transplanting tall sand willows or dryland willows or transplanting poplars to the low ground between dunes and in front of their leeward slopes, in the case of crescent shaped dunes or dune chains, to serve as sand breaks in achieving the goal of cutting off and surrounding shifting sand dunes. At the same time, either sand willows or shaohao [3097 5548], or similar sand stabilizing plant should be planted along the lower third of the slope on the windward side of the dunes so as to

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1) Xinjiang Forestry Institute: "Building of Protective Forests for Xinjiang Farmlands and Their Effectiveness as Protection." Compiled by Xinjiang Protective Forests Scientific and Technical Data. 1975.

increase the degree of ground cover, and to reduce wind speed close to the ground. The top part of the dunes will require fairly strong winds to blow away their sand and sheer them off flat across the top. When a section is flattened in this way, it should be planted to gradually form gently sloping dunes with the planted cover going from an original rate of less than 5 percent to between 50 and 60 percent or as high as 80 percent, thereby holding down the shifting sands.[1)]

7. As regards some scattered shifting sand dunes in the eastern part of the dry prairie area. In experimental research in the Zhanggutai region in the southeastern Keerqin sand lands,[41] [42] two or three rows of sand barriers were implanted about one-third of the way downward from the windward slope of the dunes to permit the wind to scalp the top of the dunes. Then, in a belt around the bottom was transplanted young wild plants called chabagahao [1567 1572 0867 5548], or yellow willow. Once the top of the dune had been scalped, plants to hold down the sand were planted all over it. Usually the sand becomes relatively stable within 2 or 3 years after which camphor pine [2874 1311 2646] of Chinese pine is planted among the rows of shrubs and vegetation on the face of the dunes to convert the shifting sands gradually into pine forests to play an outstanding role in breaking the wind, stabilizing the sands, and turning the sandy regions green.

(5) On the Problem of Control of Sand Damage to Railroads

In order to assure no blockage of the railroad in sandy regions, in addition to making a rational section of the place for the rail line, attention was also given to the different natural conditions in the regions traversed by the railroad with experiments and study given to a combination of measures using plants to stabilize the sand and engineering techniques.[43] [44] These, combined with experience in action, produced a series of measures for preventing railroad damage under different conditions as follows:

1. Where railroads traverse dry prairie areas of shifting sands and semi-fixed or fixed sand dunes, early efforts at controlling shifting sands require use of temporary engineering measures (such as obstacles to the sand). In addition, along the roadbed slope some protection must be provided (such as laying of sod using sod available locally from land between dunes), planting of protective cover to trap sand along both sides of the line, and transplantation of plants to stabilize the sand on sand dunes. Since moisture conditions in prairie areas are relatively better than those in barren areas, once the surface of the shifting sands has been stabilized through sand obstacles in the form of a checkerboard of grasses or verticle obstacles, camphor pine, Chinese pine and such shrubs may be transplanted there to bring about a striking change in the appearance of the surfaces of the dunes. In the case of the shifting sand dunes of northeast Naiman in the center of the Keerqin sand lands, more than 10 years after the aforementioned measures were

1) Song Bingkuei [1345 3521 1145], Huang Zhaohua [7806 0340 5478], and Zhang Jingye [1728 2417 2814]: "Control the Shifting Sands To Build the Prairie -- the Example of Wushenzhao Commune." 1979.

taken the plant cover on the surface of the dunes has increased from 3 percent before control began to between 30 and 40 percent.

2. On the edges of barren areas where shifting sand dunes roll along the rail line,[45] the road bed itself has to have gravel and rock on its slopes to guard against wind erosion, and on each side of the line gravel platforms should be installed to help in removal of sand and to play a role as a buffer in preventing forward movement of the sand dunes. On both sides of the line, depending on how great the annual rate of movement of the dunes, sand obstacles consisting of plant grids (no bigger than 1 x 1 meters) should be provided as a protection belt, and since these sand barriers provide a degree of roughness 220 times greater than was the case before they were put in place, wind speeds drop by 23 percent, and they serve the function of weakening shifting of sand on the surface of the dunes. Planting within the barriers of plants that stabilize the sand (such as huabang [5363 2761], ningtiao [2899 2742], shaguaizao [3097 2145 2764], and yellow willow) comes next. After a combination of these measures of sand barriers consisting of plant grids and plants to stabilize the sand have been taken, plant cover increased from an original 3 percent before control was undertaken to 14.3 percent and went as high as 25 to 40 percent in some stretches. Along the Shapotou stretch of the Baotou-Lanzhou railroad in the northeastern Tenggeli Desert, these aforementioned methods were adopted to control sand damage. In order to hasten the stabilization of the sand, water from the Yellow River has been directed to the sand dunes in recent years to use irrigation to create forests. Following experimentation, it is felt that irrigation is most effective in creating a mixture of trees and bushes. Tree varieties included locusts, narrow-leaved oleasters, erbaiyang [0059 4101 2799] and Xinjiang poplars; bush varieties included huabang, ningtiao, yellow willow, and false indigo.

3. In regions where railroads cross barren areas and are subject to the depredations of Gobi sandstorms, preliminary control consists of temporary use of a combination of sand defense ditches and sand defense embankments. Most important is the preparation of ditches to channel water in order to irrigate and create forests to create shelter forests made up of a mixture of trees and bushes. Predominant tree varieties are erbaiyang, narrow-leaved oleaster, and the almond leaved willow. In stretches where winds are great with lots of sand, two or three rows of sand barrows are erected in front of the forest strip. Along the Yumen and Binghai sections of the Lanzhou-Xinjiang Railroad, sand damage occurred along 94.7 percent of the length, but following adoption of the aforementioned measures, that has been reduced to 2.7 percent.

A lot of work has also been done in recent years on the control of sand damage to highways.[46] [47] A great deal of scientific data has been accumulated about the South Xinjiang Highway, the Wuyi Highway, and the Baoyang Highway in the eastern part of Inner Mongolia, and much experience has been gained particularly in the field of engineering skills (including streamlined road bed sections, sand discharge sections consisting of shallow trenching and wind embankments, wind deflectors, and sand barriers).

(6) On the Problem of Use of Soil and Water Resources in Sand Areas and the Construction of New Oases

How to make full and rational use of the water, soil and vegetation resources of our country's desert areas is an important issue in desert research. During recent years primary emphasis has been given to study of the rational use of types of soil and resources, which is of particular importance to places on the prairies where agriculture and livestock raising comingle. For example: In the Keerqin sand lands, farming and livestock raising are concentrated principally on lumpy ground (for example, 87.8 percent of the agricultural land and 72.4 percent of the pastoral lands in use in the Yihuta Comm[illegible] of Kezuohou Banner are all concentrated on lumpy ground), and sand storms and drought are quite serious on these lumpy lands, which are readily subject to desertification. The way to solve this conflict is year after year to return the cultivated lumpy ground to pasture land in which the soil would be more fertile and water resources more abundant. Another example: the salt pond region of the southwestern Ordos[1] where, of the total land area, shifting sand, villages and roads accounts for 9 percent, forests account for from 1 to 2 percent, cultivated land amounts to 8 percent, and the remaining 82 percent is natural grassland (of which upland grasslands amount to 34 percent, low-lying flatlands amount to 43 percent, and grasslands with fixed and semi-fixed sand amounts to 5 percent). The historical legacy of abandonment of crop growing, plus the opening of the prairie to cultivation has caused serious wind erosion, which has contributed to the advance of desertification. In future, cattle raising must become paramount in the northern region where shifting sands predominate with the development of agriculture in some areas but with the building up of forests that are a mixture of trees and bushes to counter the winds and stabilize the sand, principally to protect farm and pasture lands. In the central region where mixed uplands and bottomlands dot the landscape like patches of moving sands, livestock raising should predominate, and protective measures using the planting of vegetation should be adopted in areas currently undergoing desertification. In the southern region where ravines and hills in the loess predominate, maintenance of the water and the soil must be done. Except for the development of agriculture in certain areas, this region should be principally for pasturage.

While launching study of natural resources and soil types in sand regions, a large amount of experimental research was also done on the building of new oases in the sand regions, among which work done by some military production units on farms on the fringes of the Guerbantonggute Desert and the Takla Makan Desert in Xinjiang was outstanding. On the basis of experiments in these areas, the following measures should be taken in connection with the building of new oases in sand areas.

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1) Salt Pond Sub Unit of the Ningxia Mountain Region Scientific Research Corps: "Problems With Use of Natural Resources and Development of the Livestock Industry in Ningxia Salt Pond Areas." Ningxia Scientific and Technical Information Office, 1977.

1. Totally planned construction of water conservancy and rational use of water resources:[1] An example is the Manasi River Basin in the Shihezi Reclamation area, where key points were set up at points leading out of the mountains and trunk canals constructed to carry water to reservoirs constructed on low-lying ground around the edges of alluvial and diluvial fans. At the same time, brick, cobblestone or brick-lined concrete leak-resistant aquaducts were built that were able to channel 70 to 75 percent of the water from the river course. Water drainage systems used different systems depending on natural circumstances. Natural drainage was used on the alluvial fan at the front of the mountain. On the plain around the edges of the fan, a combination of natural drainage and vertical shaft wells for drainage and irrigation was used. On the fringes of the desert, drainage was done by regulating the quota of irrigation.

2. Level the land to improve the soil. For clay soils on the surface of the ground around sand dunes, the principal way of doing this is to mix sand into the clay to improve the soil characteristics. This will destroy their hard and impervious nature, bring about a reduction in the unit weight of surface soil, and increase porosity by more than 10 percent. At the same time it will also bring about a reduction of 0.7 percent in the total salinity of 0-10 millimeter soils, conserve moisture, and increase by 3.5 percent the soil water content of the surface layer of 0-10 millimeter soil. Soil may also be improved by the growth of alfalfa and sweet clover as green manure. After 3 years of growing alfalfa, the soil at the Mosuwan Reclamation Area was 0.924 percent organic (when it was 0.284 percent prior to improvement).[48] Salinized soil was improved through measures such as extraction of salt through washing, washing out salt through the growing of rice, and flushing away salt in open ditches.

3. Planting of trees to create forests to prevent sandstorms: Principally employment of a combination of methods of combining ditches, roads and forests in forest networks to protect farmland or protection through sparse plantings of forests in small grids are most effective.[2]

In the case of desertized soil in prairie regions, such as in the Yulin region of northern Shaanxi, water was channeled in and sand was transported, with human labor being used to level the land and improve the soil (innundation of silt land, leveling of the ground with human labor, planting rice,

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1) Mass Experience Summation Unit of the Shihezi Reclamation Area, Water and Land Resources Development and the Building of New Oases in Desert Areas. "Research on China's Deserts and Control of Desertification," Lanzhou Desert Research Institute, Chinese Academy of Sciences, 1979.

2) Xinjiang Forestry Science Institute, Xinjiang Military Production and Construction Unit Agricultural Institute, Military Unit Institute of Agriculture, Forestry, and Livestock, "Survey Report on Effectiveness in Protection of Forest Shelter Belts for Farmlands." Xinjiang Shelter Forest Scientific and Technical Data Collection, Xinjiang Agriculture Institute, 1975.

growing of sweet clover and shadawang [2097 2092 2489] as green manure), and planting trees to create forests. This converted to farmland a great amount of desertized soil that had been historically in the form of shifting sand for the most part. For some moving sand dunes, suitable varieties of trees may be selected (as for instance huaban[illegible] angchai [2799 2691], sand willow, and ningtiao) and planted in certain positions on sand dunes to stabilize the shifting sand. In Hongshi Gorge in Yulin, for example, after more than 20 years of effort, ground cover has increased from an original 5 percent to more than 60 percent; moving sand dunes have been transformed into stationary sand dunes, and the desertification process has been reversed.

3. Outlook

Though study of China's deserts has made some achievements during the past 30 years, a great deal of work still remains to be done in the future inasmuch as the desert area of our country is so great, the natural conditions abominable, and current testing skills and techniques out of date. Future development of national economic construction in desert areas will place greater and greater tasks upon desert research. Three aspects merit particular attention.

1. Attention to comprehensive study. Desert science is a newly developed science that involves earth sciences, biology, agriculture, livestock and forestry science, and is related as well to mathematics, physics, chemistry, and engineering technology. Therefore, it is required that these sciences be intermingled and not simply mixed together when concentrating on a natural environment such as deserts. Only in this way can desert science be furthered to make desertology truly become a science that studies the form, development, natural characteristics and the transformation of deserts.

2. Reform of research methods. Desert research cannot stagnate again in generalized description and explanation, but must use modern scientific techniques (such as computer technology, high speed dynamic photography, remote sensing and remote checking) to arm itself; it must strengthen testing techniques and methods, and improve existing sandstorm tunnels, research laboratories, etc. For on site experimental research, the need is for efforts on the natural conditions in different sand regions, and setting up experimental research stations in desertology of different types.

3. Strengthening research on various problems in desertology. In order to make desert research better serve national economic construction, research into various problems in desertology must be strengthened, including the ancient geography of the 4th century, the formation of deserts and the process of formation and development of the earth's surface, and the laws governing motion of sandstorms; changes to the deserts in historical times, and the present process and development trends in desertification; the ecological system of natural resources in desert regions and ways to use these resources in a rational way, as well as study of changes in the environment following development; principles underlying and methods for use of plants to stabilize sand under different natural conditions. It is also necessary at the same time to summarize in a systematic way the data derived from the past 30 years of desert research and publish it in special works such as "China's Deserts."

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CONFERENCE ON FIRE PREVENTION IN HARVEST AREAS HELD

OW262233 Beijing XINHUA Domestic Service in Chinese 0137 GMT 26 Apr 80 OW

[Excerpts] Zhengzhou, 26 Apr--It was pointed out at the national conference on fire prevention during the wheat harvesting season--a conference recently called by the Ministry of Public Security in Xuchang, Henan--that fire prevention should be stressed at the wheat threshing grounds, and that special attention should be given to fires caused by farm machinery and electrical equipment. The conference called on all wheat production regions to take effective measures to strictly guard against the outbreak of fires during the wheat harvesting period.

At present, wheat harvesting has already begun in some parts of southern China. Following the development of agricultural mechanization and electrification, the wheat production regions have begun to use more and more tractors, diesel engines and electrical motors for threshing, and the number of communes and brigades that use threshers has been increasing every year. However, the causes and frequency of fires in the wheat threshing grounds have also increased. For this reason, the conference held that, eliminating the danger of fires caused by electrical equipment used in the wheat threshing grounds has become a major issue that needs an urgent solution in order to prevent fires during the wheat harvesting season.

The conference pointed out that to insure the safety of the wheat threshing grounds, it is necessary to do the following jobs properly:

1. The wheat threshing grounds must be at a safe distance from railways, highways, high-voltage power lines, residential houses, feeding rooms, wheat threshing grounds of neighboring units and places where fire and electricity are being used.

2. A production team cadre should be assigned to take charge of fire prevention on the wheat threshing grounds.

3. It should be insured that the mechanical and electrical equipment used on the threshing grounds are in good condition and have fire prevention devices.

4. Knowledge of fire prevention should be publicized among the operators of mechanical and electrical equipment, and fire prevention responsibility and a warning to strictly follow the regulations for safe operation should be clearly set forth.

5. The electrical wires leading to the wheat threshing grounds must be protected by pipes and must be buried underground.

6. Smoking is strictly prohibited on the wheat threshing grounds. Children and the mentally imbalanced are banned from entering the threshing grounds.

CSO: 4007

BRIEFS

PAULOWNIAS INTERPLANTING--Beijing, April 23--Crops on a total of 370,000 hectares of farmland in north and central China have been interplanted with paulownias this year, according to the Ministry of Forestry. Statistics show that eight of China's provinces and autonomous regions had interplanted crops on 1.4 million hectares with paulownias by the end of 1979, including 800,000 hectares in Henan Province and 260,000 hectares in Shandong Province. In addition, there are paulownias along roads and around villages, bringing the total to 700 million in these areas. They provide 70,000 cubic metres of paulownia timber for export a year. Interplanting of crops with paulownias is a new method of protecting farmland. Generally, an average of 60 paulownias are planted on 1 hectare of farmland. This helps to reduce the damage to crops caused by late frost, spring drought and the dry and hot winds before the summer harvest. Experiments show that the per-hectare yield of wheat on land interplanted with paulownias is 10 to 20 per cent higher than that on land without paulownias, and that of maize is 10 per cent higher. Paulownias grow in 23 of China's provinces, municipalities and autonomous regions, everywhere except in the northeast and northwest where it is too cold for the trees to grow. [OW240241 Beijing XINHUA in English 1326 GMT 23 Apr 80 OW]

ANTHER CULTURE BREEDING--Shenyang, 24 Apr--A young Chinese scientist has succeeded, for the first time in China, in breeding young plants of sorghum by anther culture. Thirty-two-year-old Zhao Wenbin of the Jinzhou Research Institute of Agro-sciences in Liaoning Province, northeast China, produced after 2 years' hard work what is called the "test tube" babies of sorghum by using its anther, the pollen-producing part of the stamen of its flower. Pollen culture represents a late development in modern techniques of crop breeding. It helps produce new varieties that are resistant to degeneration and show stable hybrid vigor. Prior to Zhao Wenbin's achievement, Chinese scientists had used anther culture to produce young plants of wheat and other crops as well as saplings of poplar and rubber trees in test tubes. [Text] [Beijing XINHUA in English 0714 GMT 24 Apr 80 OW]

HIGH-YIELD FORAGE GRASS--Lanzhou, 26 Apr--A new variety of high-yield, cold-resistant forage grass developed in Gansu Province is now grown in the coldest parts of north, northeastern, and northwestern China. The grass, named elymus sibiricus, was found to adapt well to the poor soil and cold winter weather of 48 degrees below zero centigrade on the highlands, 4,200 metres above sea level, in Gansu Province. The grass, which grows at the rate of between 26,000 and 30,000 kilogrammes per hectare, turns green ten days earlier than other forage grass. The new grass began to be developed in 1970 by a Lanzhou horse farm of the people's liberation army, which has developed four other varieties of the grass. Now the farm has 50,000 hectares of areas sown to this new grass and gathers some 250,000 kilogrammes of seeds a year. Elymus sibiricus has been called "king of forage grass" by herdsmen in 14 provinces and autonomous regions. [Text] [Beijing XINHUA in English 0819 GMT 26 Apr 80 OW]

REMOTE SENSING IN FORESTRY--Harbin, April 29--China will make wider use of the aerial remote sensing technique to survey forests, detect forest fire and prevent forest diseases and insect pests. Thirty-five trainees from the Ministry of Forestry, the Ministry of State Farms and Land Reclamation and the Chinese Academy of Forestry Sciences, and from seven colleges and eight provinces, are now attending a class in remote sensing techniques in forestry run jointly by the Food and Agricultural Organization of the United Nations and the Chinese Ministry of Forestry. It is the first such training class ever run by the Food and Agricultural Organization of the United Nations in China. The organization provides the class with funds, instruments and textbooks. In addition, it has also sent five experts to deliver lectures. Dr. K. D. Singer, a senior offical of the Committee on Forestry under the organization of the United Nations, is in charge of the class. The 30-day training class includes lectures, experiments and practice. During the class, the foreign experts will make academic reports and have discussions with the Chinese colleagues. After the class closes, the trainees will have 20 days of field training in a forest area under their guidance. Their experiences will be popularized throughout China. [Text] [OW292119 Beijing XINHUA in English 1256 GMT 29 Apr 80 OW]

AFFORESTATION CAMPAIGN--Beijing, 25 Apr--China has scored relatively good results in promoting the afforestation campaign in the first spring of the 1980's. While the spring afforestation campaign is coming to a close in various provinces, municipalities and autonomous regions in the south, the campaign has just reached its high tide in the north. According to recent, incomplete statistics by the Ministry of Forestry, south China's 13 provinces, municipalities and autonomous regions have already afforested 30 million mu of land, an increase of 5 million mu over the same 1979 period. The circular on afforestation issued by the CCP Central Committee and the State Council this spring has effectively promoted afforestation work, as many leading cadres of the party, government and army have joined the masses in afforestation work. [Beijing XINHUA Domestic Service in Chinese 0140 GMT 25 Apr 80 OW]

NORTH CHINA WHEAT SEEDLINGS--Due to a shortage of rain and snow last autumn and winter, plus continuing drought in some areas and low temperatures in the later part of winter, most of the winter wheat seedlings on the North China plain are small and weak and have few tillers this year. This type of wheat seedlings has poor resistance to low temperature and frost, and requires preventive measures for protection. [Beijing RENMIN RIBAO in Chinese 1 Apr 80 p 2]

CSO: 4007

BRIEFS

ANHUI COUNTIES COTTON PLANTING--As of 22 April, Dangtu County had in the main completed cotton sowing on 100,000 mu of cotton fields. As of 20 April, sowing had been completed on Tianchang County's 100,000 mu of cotton fields. Sowing has also been completed on 50,000 mu of cotton fields in Wuhe County. [Hefei Anhui Provincial Service in Mandarin 1100 GMT 24 Apr 80 OW]

ANQING PREFECTURE SPRING FARMING--Spring farming is in full swing in Anqing Prefecture, Anhui. As of early April, transplanting of early rice had been completed on 70 percent of the prefecture's 2.7 million mu of early rice fields, and the prefecture's 600,000 mu of cotton fields are being prepared for planting. [Hefei Anhui Provincial Service in Mandarin 1100 GMT 24 Apr 80 OW]

CSO: 4007

STEPS TAKEN TO POPULARIZE AGRICULTURAL SCIENCE, TECHNOLOGY

Proposal for Popularization Discussed

Guangzhou NANFANG RIBAO in Chinese 18 Feb 80 p 1

[Text] The Provincial Science Commission invited representatives from various agricultural departments, heads of units, and specialists to participate in a seminar on the strategies of economic development via organization of human and material resources, selection of efficient and profitable agricultural technology, and the utilization of natural resources in order to promote diversified development in agriculture, forestry, animal husbandry, fisheries, and rural subsidiary industries. The seminar was the result of an urgent demand on the part of the National Science Commission to promote the application of agricultural technology in developing local resources, as was promulgaged in a report, dated 6 February, by concerned officials.

Participants in the seminar discussed in great detail the suggestions of the officers of the Provincial Science Commission. They reveiwed the state of agricultural development in the province in the previous year. It was generally acknowledged that scientific research, rural extension, and infrastructure in agriculture and animal husbandry in the province were not properly managed. Also, the allocation of labor resources was not thoroughly carried out. The sources of development funds were not reliable. In addition, some comrades were lacking in understanding with regard to scientific technology and productive power. Subsequently, quite a few innovations in our agricultural technology had not been applied. In order to accelerate agricultural production in the province, we must hold on to those efficient methods used in the past, such as the application of green manure, seed selection and improvement, transplantation, and crop rotation of rice and peanuts. On the other hand, we must seriously examine the many agricultural innovations and advanced techniques that have come about recently in various localities, and actively experiment, demonstrate, and promote their adoption. Examples include the extension of hybrid rice, high-yielding agricultural produce, new methods of sugar can cultivation, hardy and insect resistant green manure, high-yielding and high-quality grass, and the gradual development of controlled pasture areas. Also, efforts should be made to raise high-quality cattle and water buffalo, to apply cross-breeding methods, to make use of marsh gas so as to increase the amount of fertilizer and energy available for rural development,

and improve the methods of peanut cultivation by deep furrowing, building of embankments, selection of short, sturdy plants, and close planting in order to increase per unit area productivity.

Rural cadres and specialists in the seminar pointed out that successful rural extension work depended on experimentation, demonstration, and consideration of local conditions. Hasty work and over-extension should be avoided. The next step is to develop a healthy system of rural research and extension networks. The major task of rural units below the country level is to ensure successful scientific research and extension work. Thirdly, we should actively develop scientific training programs and encourage scientific extension activities in order to raise the level of scientific knowledge among cadres and the masses. Fourthly, we should consider rural extension work as important as scientific research, and reward units or individuals who can successfully propagate the application of scientific technology. Fifthly, after the logistics of extension work are defined, the relevant departments should cooperate and concentrate their efforts in really producing good results.

The comrades who attended the seminar were determined to work with our cadres and the masses to define the specific tasks in our rural extension program and, based on the local conditions of our province, to wholeheartedly grasp the urgent work of disseminating agricultural scientific technology and work hard to accelerate agricultural production in our province.

Training for Agricultural Cadres

Guangzhou NANFANG RIBAO in Chinese 18 Feb 80 p 1

[Article by Zhuang Qiuxing [8369 4428 5281]]

[Text] On 31 January, the first class of rural cadres graduated from a training program sponsored by the South China Institute of Agriculture under the auspices of the Department of Agriculture. Diplomas were given to 74 rural cadres from the provinces of Fujian, Guangxi, and Guangdong after they had gone through more than 4 months of vigorous training.

The graduates are leadership cadres in charge of agriculture at the provincial, county and bureau levels, or in agricultural institutions. In the course of the program, they took a total of nine courses on agricultural economics and policies, physiology of rice, early crop growth, crop cultivation, crop protection, fertilization, forestry, animal health care, and farm mechanization. Based on their knowledge of the patterns and characteristics of agricultural production in the province, they had individually selected specific courses on fruit tree production, vegetable farming, sericulture, tea culture, fresh water pond fishing, and coastal fish farming. In addition, they attended sessions on the present state of agricultural technology in general and the state of agricultural technology in Guangdong in particular, rural ecology and farming systems, and the application of nuclear power in agricultural technology. In the course of more than 4 months, they concentrated on studying rural economic management and the basic principles and theories of agricultural production.

The teachers at the South China Institute of Agriculture contributed their efforts to consummate the training program. They compiled various teaching materials. Among the 48 teachers in the program, 22 are full or associate professors. The deputy director of the institute, Mr Shanhuan Zhao [0810 2970 6392], and Professor Peiwen Li [3099 2429 2621] delivered lectures during the program.

Information Network Set Up

Guangzhou NANFANG RIBAO in Chinese 24 Feb 80 p 1

[Article by Zhou Xun [0719 6598]]

[Text] An initial information network for the dissemination of agricultural science and technology from the provincial to the county level has been set up to serve as an assistance and intelligence apparatus for cadres in directing agricultural production and agricultural experimentation. Early this month, the Provincial Institute of Agriculture convened a meeting in Shaoguan City to review the conditions and ex eriences in various localities in developing such an information networ:. During the meeting, the Shaoguan District, Hainan Administrative District, and the Foshan District information networks were chosen as advanced units.

The agricultural technology information network is made up of members in groups and units responsible for intelligence materials who are selected from agricultural bureaus, scientific committees, and agricultural technology departments or stations. At present, more than 30 production, education, and research units are participating in the agricultural technology information network at the provincial level. Guangzhou City, 8 districts, and more than 50 counties have already established information network groups. The number of full-time and part-time members engaged in this information network in the province has reached 400.

Since last year, the information networks at various levels in the province have focused on problems of production and scientific research. They employed various means to collect and disseminate new results and experiences of agricultural scientific research at the provincial, national, and international levels and made suggestions to cadres at various levels and in various research units. The provincial agricultural technology information network, which serves as the leading unit under the Provincial Institute of Agricultural Research, suggested constructive criticisms on the errors made in the province with regard to rural reforms which were not based on the natural conditions or which were not in accordance with economic principles. The network organized special investigation groups in various localities to systematically summarize the positive and negative results of agricultural experimentation in the province. The suggestions made by the network were highly esteemed by various party committees and agricultural departments.

Hydroponic culture in hothouses is a constructive method of cultivation in some areas of our province. In order to help extend this method of cultivation, the members of the Shaoguan District information network have investigated

14 stations of different environmental conditions and reported on their results of experimentation. The reports offered invaluable information to relevant leadership cadres and promoted positive effects. Last year, in a massive drive to increase agricultural production within the county, the Huaiji County information network group investigated the nature of various high-yielding crops and compiled the document "Report on How Higher Production Is Achieved by Attacking Key Problems," which was disseminated in time to contribute to a rise in agricultural productivity.

Cooperation, Consultative Groups Established

Guangzhou NANFANG RIBAO in Chinese 10 Mar 80 p 1

[Article by Ma Yaoxing [7456 5069 2502]]

[Text] In order to strengthen leadership in agricultural technology research in our province and to strengthen the power agricultural scientific work exerts on agricultural production, the provincial people's government has recently established the Guangdong Province Agricultural Technology Research Cooperation Group and the Agricultural Scientific Consultative Group.

The group leader of the Guangdong Province Agricultural Technology Research Cooperation Group is Deren Wang [1795 0117 3769], who is the chairman of the Provincial Agricultural Commission. The deputy group leaders are Jiahe Liang [0857 0735 2733], head of the Provincial Academy of Sciences, and Juncai He [0193 2088 0149], deputy chairman of the Provincial Science Commission. The membership of the group is made up of leadership cadres in the Provincial Agricultural Cimmission, Provincial Science Commission, Provincial Department of Agriculture, Provincial Institute of Agriculture, and the South China Institute of Agriculture. At the end of the last month, the cooperation group decided that from this year on, efforts should be made to develop agricultural research and to widely carry out agricultural technology extension work.

The Provincial Agricultural Scientific Technology Consultative Group is composed of 16 well-known specialists employed by the provincial people's government. They are: Shanhuan Zhao [0810 2970 6392], Peiwen Li [3099 2429 2621], Yunyu Mai [5686 3842 7796], Zhelong Pu [5832 7893 5543], Junlin Zhong [0193 7792 6988], Yaoxiang Huang [5069 4832 7806], Pengfei Shen [7720 7378 3088], Tingfan Cao [1694 5672 2580], Ronglu Guang [2837 4389 6782], Faxi Lu [4099 3588 7120], Weiqin Chen [3555 2953 7115], Zhisong Zhu [1807 2646 2612], Jianming Wang [7003 2494 3769], Jingzhen He [2417 4176 0149], Hongnian Fei [7703 1628 6316], and Hongshu Huang [7703 2873 7806]. Comrade Shanhuan Zhao is the group leader.

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CSO: 4007

BRIEFS

FOSHAN MULBERRY TREE ACREAGE--Mulberry tree acreage has been expanded this year in Foshan Prefecture, the major silkworm producing area of Guangdong Province, by more than 35,000 mu, or 25 percent of last year's acreage. Last year the average per mu yield of cocoons from the prefecture's 140,000 mu of mulberry trees was close to 300 jin, and the total cocoon output accounted for more than 90 percent of the province's total output. Some former mulberry tree groves that were unwisely converted to grain crop land in recent years were used to grow mulberry trees again this year. [Beijing RENMIN RIBAO in Chinese 11 Apr 80 p 2]

CSO: 4007

BRIEFS

AFFORESTATION PROJECTS--In 1979 Heilongjiang Province afforested 1.72 million mu of land, overfulfilling the target stipulated by the state by 2.5 percent. [Harbin Heilongjiang Provincial Service in Mandarin 1100 GMT 25 Apr 80 OW]

HAILUN COUNTY AFFORESTATION--As of 23 April, Hailun County in Heilongjiang Province had afforested 26,500 mu of land, an increase of 5,000 mu over last year's same period. [Harbin Heilongjiang Provincial Service in Mandarin 1100 GMT 25 Apr 80 OW]

CSO: 4007

BRIEFS

XINXIANG COUNTY COTTON--Zhengzhou, 27 Apr--Xinxiang County, Henan, has completed planting 115,000 mu of cotton, thanks to adopting advanced cotton planting knowhow. [Beijing XINHUA Domestic Service in Chinese 0248 GMT 27 Apr 80 OW]

CSO: 4007

HUNAN MAKES RAPID PROGRESS IN AFFORESTATION

Beijing RENMIN RIBAO in Chinese 13 Mar 80 p 1

[Text] According to a XINHUA dispatch from Changsha, reporter Liu Guanghui [0491 0342 6540] reported: Since the Third Plenary Session of the 11th Party Central Committee, the Hunan Provincial Committee of the Chinese Communist Party adopted effective measures to have carried out the party's afforestation policy and mobilized the afforestation enthusiasm of the broad ranks of cadres and the masses. Last year, in the province, barren hill afforestation reached 5 million mu: 190 million trees of "four side" afforestation and 300,000 mu of slash reafforestation. There were 6.1 million mu of tea-oil tree forest, 1.6 mu of tung oil forest, and 500,000 mu of bamboo forest reclaimed. A total of 30 million plus seeds were collected and 100,000 mu of trees were planted. At the present time afforestation activities of the masses are being concretely carried out.

In order to develop afforestation, the first measure adopted by the Hunan Provincial Committee of the Chinese Communist Party was to carry out the policy of "forest first" in the forest zones and reasonably resolve the problem of grain ration of the communes and brigades in the forest zones. Last year, in addition to the 22 key forest counties defined in the previous years, 701 communes were defined as "afforestation as the primary task." In order to approximate the grain ration level of the commune members in the forest regions to that of the neighboring agricultural communes and brigades, provincial agencies involved last April allocated 100 million jin of unprocessed food grains to help resolve the grain ration problem. At the end of last year, another 100 million jin of unprocessed food grains were allocated, linking with the forest regions and helping them develop forestry.

The Provincial Committee seriously carried out the policies of forest ownership and income distribution. It announced a policy to firmly protect the collective ownership of the forest which is owned by all the people. It is prohibited to seize or to fell national forest, collective forest, or forest owned by individual commune members. There were altogether more than 10,000 cases of forest damage resolved in the province so as to safeguard the "forest law." At the same time, the Provincial Committee also repealed the regulations which prohibited the commune members to plant trees

in their residential areas. Now they are encouraged to plant trees, and no one should interfere.

In order to reasonably resolve some problems of a policy nature which had not been resolved for more than 20 years, last April departments concerned in the National Forest Meeting offered 2 million jin of commercial grains to solve the grain ration problem of 4,900 employee's dependents. These employees had gone up to the forest for many years. Based on the 2 million yuan of national tree farm investment increase last year, a document was circulated to regulate that in the national tree farms, nursing and felling should be comprehensively utilized.

Income from various types of management, instead of being turned in to upper echelons, should be used for expansion and reproduction of the forest centers. The document also clearly announced that the retirement pension of forestry employees will be equal to that of the cadres.

8953
CSO: 4007

PURCHASING OF HOGS, EGG PRODUCTS STRESSED

HK260542 Changsha Hunan Provincial Service in Mandarin 1100 GMT 23 Apr 80

[Summary] "In view of the current situation in which the purchase volume of pigs and egg products has grown faster than the sales volume, is it still necessary to firmly grasp the purchase and support the production of pigs and egg products? A provincial meeting of commerce bureau directors which is being held in Changsha has convened a seminar on this issue. The participants unanimously noted: The current abundant supply of pigs and eggs is seasonal and of a regional nature. Persistently supporting the production of pigs and egg products remains an important task of commercial departments." Commercial departments at all levels must try in every possible way to do well in purchasing and selling pigs and egg products and should not stop purchasing them or set a limit to the number of pigs and egg products they will purchase.

"During the previous period, some areas slackened their efforts to purchase pigs and egg products. As a result, some commune members failed to sell their pigs on hand and could not find vacant pigsties for newborn piglets. The enthusiasm of commune members for pig breeding was, therefore, dampened. In some areas, prices for newborn piglets have fallen, thus creating a situation in which sows have either been spayed or slaughtered. If we do not attach great importance to this issue, it is very likely that pig production will be reduced. A reduction in pig production will adversely affect the supply of pigs on the markets, our agricultural production and our commune members' income. Therefore, we must not slacken our efforts to purchase pigs and egg products but must continue to do well in firmly grasping the purchasing work."

The meeting put forward the following concrete measures:

1. We must repeatedly carry out publicity among the masses to the effect that purchasing prices for pigs remain unchanged and that the policies on purchasing pigs and rewarding pig sellers remain unchanged. We must mobilize communes and commune members to raise large porkers, to send their pigs to the purchasing stations in a planned way and to properly defer selling their pigs to the state so as to assist the state in mitigating the current temporary contradiction of the purchase volume of pigs and egg products growing faster than the sales volume.

2. Commercial departments must shift their work focus from stressing exporting and selling pigs and egg products to the state to expanding the local sales volume.

3. We must mobilize all collective catering units, railway stations, wharf supply centers and catering services to expand the sales volume of pork and eggs.

4. We must mobilize every rural production team to slaughter several more collectively-owned pigs for its own consumption during the spring transplanting, the dragon boat festival and crash-harvesting and sowing period.

5. We must strip more pigskins and extract more lard so as to increase the supply of industrial raw materials and soap production.

6. We must take resolute measures to protect sows. It is forbidden to spay or slaughter sows at will. The elimination of those collectively-owned sows that should be eliminated must be approved by county authorities. Production teams should purchase and raise those privately-owned sows whose owners have real problems in raising them.

CSO: 4007

BRIEFS

YANCHENG PREFECTURE COTTON SOWING--Yancheng Prefecture in Jiangsu Province has so far sown some 2 million mu of cotton this year, more than 60 percent of the target. In 1979 the prefecture's total cotton yield increased by 700,000 dan over the previous year. [Nanjing Jiangsu Provincial Service in Mandarin 1100 GMT 25 Apr 80 OW]

NANTONG PREFECTURE COTTON PLANTING--As of 23 April more than 1.3 million mu of farmland have been planted to cotton in Nantong Prefecture, Jiangsu, 60 percent of the prefecture's planned cotton acreage. [Nanjing Jiangsu Provincial Service in Mandarin 1100 GMT 24 Apr 80 OW]

FARM TECHNICIANS' AUTHORITY EXTENDED--The party committee of Qindong Commune in Dongtai County, Jiangsu, has given farm technicians some authority in directing production in order to enhance their work enthusiasm and increase production. The technicians now have the authority to popularize advanced technology, promote measures for increasing farm output, train technical cadres, direct farming activities, intervene against unwise commands and publish technical information and material. [Beijing RENMIN RIBAO in Chinese 14 Apr 80 p 2]

CSO: 4007

BRIEFS

AGRICULTURAL LOANS--In support of spring farming, agricultural banks throughout Jiangxi granted various types of agricultural loans, totaling 64.87 million yuan as of the end of February. Of this amount, 21.67 million yuan were earmarked for buying additional farm equipment or for the construction of small hydroelectric power plants. Preferential treatment was also given to areas with animal power shortages or with production difficulties, such as droughts. [Beijing RENMIN RIBAO in Chinese 11 Apr 80 p 2]

YONGXIN COUNTY SPRING FARMING--Nanchang, 27 Apr--By 10 April, Yongxin County, Jiangxi, had plowed 250,000 mu of cropland, or 80 percent of the early rice acreage. [Beijing XINHUA Domestic Service in Chinese 0222 GMT 27 Apr 80 OW]

CSO: 4007

BRIEFS

NEW FERTILIZER APPLICATION METHOD--The Farm Supplies Company and agricultural departments of Liaoning Province joined forces last year to promote a new program, under which the soil of farmland was tested first and then the correct type of fertilizer was supplied and applied. According to an investigation on 2.3 million mu of farmland in over 400 localities throughout the 42 counties in the province, this program has brought about an increase of more than 20 percent in crop yield in general, and in some cases a 75-percent increase. In Jianchang County, a model county for this program, this soil testing and fertilizer application method has been adopted for 180,000 mu of farmland, of which 130,000 mu produced over 1,000 jin [of grain] per mu, and some 8,900 mu produced 1,600 jin. [Beijing RENMIN RIBAO in Chinese 31 Mar 80 p 2]

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BRIEFS

MORE SELF-DETERMINATION ALLOWED--This year, the people's governments at various levels in Nei Monggol have changed their longstanding inflexibility in formulating and assigning production plans for grain, sugar and oilseed production by adopting a new system, under which the local people's governments assign only total output and procurement quotas to various leagues, banners, communes and production brigades, allowing these lower-level administrative units to decide for themselves on the size of crop acreage, where to plant, and what output boosting measures to adopt. [Beijing RENMIN RIBAO in Chinese 1 Apr 80 p 1]

CSO: 4007

BRIEFS

SOME LIVESTOCK AREAS PROSPER--The average, year-end income distribution of last year indicated that some livestock raising areas in Qinghai had become prosperous. Among the 25 counties in which animal husbandry is the sole or major industry, 12 have become rich counties in which the per capita year-end distribution for 1979 exceeded 200 yuan. In Madoi County, it was 447 yuan, the highest in the province. [Beijing RENMIN RIBAO in Chinese 28 Mar 80 p 1]

SPRING SOWING--As of mid-April, Qinghai Province had already sown crops on 4 million mu of land. [Xining Qinghai Provincial Service in Mandarin 1100 GMT 25 Apr 80 OW]

DATONG COUNTY OIL-BEARING CROPS--Datong County in Qinghai Province has sown oil-bearing crops on 90,000 mu of land this year, an increase of 10,000 mu over last year. [Xining Qinghai Provincial Service in Mandarin 1100 GMT 25 Apr 80 OW]

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WIDESPREAD CHICKEN DISEASE REPORTED

Beijing RENMIN RIBAO in Chinese 27 Mar 80 p 2

[Letter from Zhu Xiulan of Lizhuang Production Brigade in Linqing County, Shandong Province: "We Need Chicken 'Doctors.'"]

[Text] All households in our village love to raise chickens, and it is common for them to raise ten or more each. When eggs are laid during spring, money for buying salt and oil is then available. Chicken raising is an important source of income for our households.

Chicken disease, however, is our biggest worry. Last year, my family raised 40 chickens. Who would know that a widespread chicken disease occurring in the spring would kill all the egg-laying hens one by one. It hurt me so much that I was unable to eat for quite a few days. Incomplete statistics showed that this occurrence of disease killed more than 1,100 chickens in our village, while the total figure for our entire commune exceeded 23,000. What a big loss!

Now the period of epidemic chicken desease is here again. I propose that departments concerned do something quickly to control such diseases. The best way is to train [enough] chicken "doctors" in a well organized and directed manner so that each production brigade may have one or two of them to conduct regular inspections and to control the spread of chicken diseases to reduce the mortality rate.

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SHANGHAI PEASANTS URGED TO RAISE MORE SHEEP, GOATS

Shanghai JIEFANG RIBAO in Chinese 25 Mar 80 p 2

[Article by Qin Baowen [4440 0202 2429]: "Why Do Peasants Want To Raise Less Sheep?"]

[Text] Sheep and goats have supplied us with mutton or meat. They have also provided our light industry with such important raw materials as skins, wool, fat oil, intestines, hooves, horns, and our country with export commodities in exchange for foreign currency. A single piece of sheep skin can be exported in exchange for U.S. $10 or 100 jin of corn. Three exported sheep skins equal in value to one exported bicycle or sewing machine. If they were processed into marketable jackets, they could earn even more in foreign exchange currency. Also amazing is that a single sheep or goat can supply half a mu of farmland with 1 year's needs for high-quality basic fertilizer. For this reason, the economic returns on our investment in raising sheep or goats are high. Although efforts have been made by communes and production brigades on the outskirts of Shanghai to develop the sheep raising industry during the past 2 years, there has been no increase in the number of sheep and goats raised there. According to Jiading County's statistics, there were only 20 percent of commune members and production teams interested in raising sheep and goats in the county; in 1979, only a little over 80,000 sheep and goats were raised there, no more than the county's 1957 figure.

Why was there a decline in the number of sheep and goats in Shanghai suburbs? Was it caused by shortages of sheep sheds and feed? Probably so. But this was not the principal cause. The principal cause stemmed from the incorrectness of the guiding principles and economic policies now being enforced by the departments in charge of the development of animal husbandry.

At present, their policy on the development of livestock production is mainly aimed at raising pigs. Since pigs can supply the market with an important nonstaple food--pork, no one should have any objection to raising pigs. We should attach importance to this business. But overly concentrating on raising pigs in disregard of the actual market needs for all kinds of meat will lead us to ignore the business of "raising the six species of

domestic beasts well." It must be pointed out that our current price policy and relatively low purchase prices for sheep and goats are not encouraging to their raisers. For example, a mutton sheep weighing 50 to 60 jin normally takes a year to grow and costs its tender at least 40 workdays in preparing its feed. But it can be sold for only 20 yuan at the market price. Although the sheep skins prepared for export are a good foreign exchange earner, the profits that go to peasants are very little because of their unreasonable purchase prices. As a form of fertilizer, sheep feces are superior in quality to a pig excrement. But the purchase prices set for both by some cooperatives are the same. An accounting of economic returns on the investment in raising sheep and goats has reminded many commune members and production teams that sheep and goat raising is not a profitable business, and it will be more lucrative to engage in other sideline occupations. Low prices have also forced some commune members to slaughter mutton sheep for their own consumption.

The Party Central Committee's "Decisions on Some Questions Concerning the Acceleration of Agricultural Development" points out: It is necessary to vigorously develop animal husbandry and to proportionately increase its role in agriculture. Special attention must be paid to raising more cattle, sheep, goats, rabbits and other grass-chewing domestic animals." At a time when feeds are in short supply, we must concentrate on developing the sheep and goat raising industry as a means to support the developemnt of the light industry and foreign trade and to meet the growing demands of urban and rural people for nonstaple foods. A pig usually consumes nearly 2 1/2 jin of grain for every jin of meat it produces. Last year, nearly 30 percent of grains produced in Jiading County were used to feed pigs. So far, the pigs there have consumed over 30 million jin of feed grains more than allowed. Feed shortages have also forced some production teams to feed pigs on their grain reserves. All signs indicate that the current pig feed shortages have left us no alternative but to step up the development of the sheep and goat raising industry. Sheep and goats are grass-chewing animals. Vigorous efforts must be made to raise more sheep and goats as an important step to save our precious food-grains.

Some comrades have argued that it is difficult to find enough green grass to feed sheep and goats in Shanghai suburbs, where there are neither mountain slopes nor pastures. True, the outlying area of Shanghai is heavily populated, with very limited space for growing grass to feed sheep and goats. But does that mean that it is entirely unsuitable for raising sheep and goats? The opposite is true. I recently visited Jiangqiao commune, whose objective geo raphic features are almost the same as other communes in the area. The authorities there have listed raising sheep and goats as an important item on their agenda. They have also backed up this measure with a related policy to mobilize the commune members to look for sources of feed. The commune members have spent spare time collecting discarded vegetable leaves and stalks, cutting grass along the riversided, and picking up weeds from the waters and herbs thrown away by the herb medicine producing factories and bringing them back to feed sheep and goats.

In 1979, the commune raised over 15,000 sheep and goats, accounting for one-fifth of the total number of sheep and goats in its county. In other words, the commune members there raised 1.2 head of sheep or goats per-capita that year. If over 200 communes plus state-run farms worked like Jiangqiao commune, and if each commune member were urged to raise one sheep or goat there a year, millions of sheep and goats could be raised in Shanghai suburbs.

To achieve this objective, we must discard the present single-product concept and foster the idea of "raising six species of domestic beasts well." I also suggest that while considering an overall livestock production plan, we should set a ceiling on the output of meat and urge consumers to treat marketable mutton just like pork. Economic policies which involve purchase prices, feed supply and fertilizer prices should be worked out in a way that encourages commune members to play an active role in raising more sheep and goats. Purchase prices must be revised upward for sheep skins and wool, which can be exported in exchange for foreign currency. We must set reasonable purchase price for sheep excrement sold to collectives by individual commune members. Special plots must be set aside for production teams to grow green grass to feed sheep and goats. Refuse from the production of cotton-seed oil is a good feed for sheep and goats during the winter season. Such refuse should be made available to peasants under an overall distribution plan so that they can use it to feed sheep and goats. Where conditions are ripe, sheep skins and wool should be processed into finished goods in order to increase the income of peasants. Only in this way can more sheep and goats be raised in Shanghai suburbs.

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BRIEFS

KASHI PREFECTURE SPRING FARMING--By early April, Kashi Prefecture had sowed more than 300,000 mu of land to (?wheat), barley and sesame, basically completing this year's sowing plan for these crops. [Urumqi Xinjiang Regional Service in Mandarin 1300 GMT 24 Apr 80 OW]

CSO: 4007

BRIEFS

AID TO HILLY COUNTIES--Last year the provincial party committee and people's government of Zhejiang alloted 2,086,000 yuan and 160 tons of steel material and 120 cubic meters of lumber to poor communes and production brigades in 22 hilly counties to enable them to build ranches to raise cattle, sheep and rabbits. [Beijing RENMIN RIBAO in Chinese 15 Apr 80 p 2] Recently the provincial party committee and people's government of Zhejiang allocated 5.2 million yuan from state funds for people's communes to 11 poor hilly counties to help them develop commune-run enterprises by utilizing the rich local natural resources. [Beijing RENMIN RIBAO in Chinese 18 Apr 80 p 1]

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